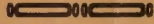




BRITISH HONDURAS



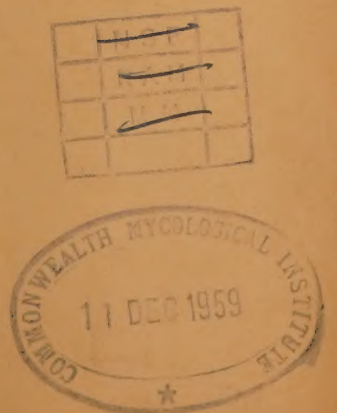
ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR

1957



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ANNUAL REPORT OF THE AGRICULTURAL DEPARTMENT FOR THE YEAR 1957

PART I

POLICY.

There were no significant changes in policy during the period under review. The highlights of the year were the Livestock and Pasturage Subsidy Scheme; Cacao development in the Stann Creek district; the rapid expansion of sugar cane cultivation and increased sugar production in the Corozal district; and the success of the Rice Pilot Scheme at Mussel Creek. These are referred to under the appropriate headings in the report. Once again, shortage of Senior Staff restricted the activities of the Department in several directions.

WEATHER CONDITIONS.

2. The year was generally a dry one with rainfall in most areas below average. Only minor flooding of rivers and creeks occurred and this was insufficient to cause any crop damage.

3. In the Toledo District, the wettest district of British Honduras, heavy rains in January and February affected the crop of Red Kidney beans, and at the Mussel Creek Rice Station January and February were also wet months with a total of 11.84 inches of rain followed by a normal dry season through March to May. October to December were markedly dry.

4. A dry spell in the latter portion of the year also prevailed in the Northern Districts and had a deterrent effect on growth and yields of cane, corn, beans and other crops. In the Corozal District, plantain cultivations near the village of Sarteneja suffered slight damage by strong northerly winds during the month of November.

5. Details of Rainfall, Pressure, Temperature and Humidity records are shown in Appendix I.

PRINCIPAL CROPS.

6. *Citrus*: An estimated 8,400 acres were under cultivation at the principal producing centres; 5,847 acres in oranges, 1,153 in grapefruit and 800 in limes. Although there is considerable potential for the expansion of production of oranges and grapefruit, further expansion was called to a halt in 1955 through the Citrus Agreement with the Government of the United Kingdom, which while imposing restrictions on new plantings, allowed for replanting of old low yielding cultivations.

7. The 1957 crop was an extremely good one and reaping was not hampered by rains. Orange production again rose through new orchards coming into bearing during the year.

8. 161,688 boxes of grapefruit and 102,713 boxes of oranges were reaped in the Stann Creek Valley. There were no exports of fresh fruit.

9. A plant pathologist attached to the International Cooperation Administration inspected the citrus orchards in the Stann Creek and El Cayo Districts and found no evidence of any serious disease.

10. Manufacturing data from the Citrus Company are as follows:—

TABLE ONE.

Grapefruit.

Sections A/2s—24 Cartons	..	..	..	174,275
Juice A/2s—24 Cartons	..	..	..	376
Juice A/10s—6 Cartons	..	..	..	25,908
Concentrate Barrels—24G	..	..	..	215
Concentrate A/10s— 6 Cartons	..	..	..	1,974
Oil —Lb.	..	..	..	1,992
Hicell A/2s Cartons	..	..	..	3

Oranges.

Juice— A/2s—24 Cartons	..	..	30,976
Juice— A/10s—6 Cartons	..	..	18,460
Hicell Raw Barrels 42G	..	..	2
Concentrate—A/10s—6 Cartons	..	..	8,159½
Concentrate— Barrels 43G	..	..	198
Oil —Lb.	..	..	25,005

11. *Sugar Cane.* The total acreage under cane in the Corozal District was approximately 6,500. The Factory operated from the 15th March to the 24th August, and two hundred and fifty one farmers delivered a total of 77,049 tons of cane. Deliveries in 1955 and 1956 were 21,563 and 35,247 tons of cane respectively.

12. Factory statistics are as follows:—

TABLE TWO.

	1956	1957
Tons, cane ground	25,247	77,049.55
Tons, sugar made	3,510.05	7,855.67
Tons, cane per ton sugar	10.04	9.81
Gallons, molasses made	200,398	377,477
Average grinding rate, tons per hr.	21.40	29.06

Damage by Froghopper in the Corozal areas was very much less than in 1956 due to the increased use of Agrocide.

13. Only small quantities of the molasses made were utilized for the manufacture of rum and the major portion was run off to waste.

14. Four small mills made 34 tons Muscovado sugar, and 11,102 proof spirits of rum were produced at two distilleries in the Toledo District.

15. *Maize.* Favourable weather conditions in the lowlands of the Cayo District accounted for yields of around 1,000 lb. per acre, but yields in the eroded hill lands around Benque Viejo were only about 700 to 800 lb. to the acre. A survey made of approximately half the corn acreage of the district showed that about 1,400,000 lb. of shelled corn were harvested. Thus, it was estimated that the district produced some 2,700,000 lb. of corn from about 3,000 acres; or an average yield of about 900 lb. per acre.

16. Purchases at the town of El Cayo by the Marketing Board were 176,096 lb. of corn as compared with 263,363 during 1956. This reduction in output was due in part to the Board's decision to discontinue purchases at intermediate points on the Belize-Cayo Road.

17. Due to the long drought experienced in the Northern Districts yields were disappointing, and were as low as 400 lb. to the acre in some areas. 173,416 lb. were sold to the Marketing Board at its buying centres in Corozal and Orange Walk.

18. The area planted to corn in the Toledo District, exclusive of the Indian villages of San Pedro, Colombia, San Miguel, Pueblo Viejo and the Alquilos, amounted to 864 acres. The crop there was an extremely good one and the purchases by the Marketing Board—517,319 lb.—were the highest ever recorded in that District.

19. As corn is a staple food in the Indian Reservations, both for man and animals, the improvement in production has meant a lot to the Indians after the two very lean corn years of 1954 and 1955. One result has been a very noticeable increase in hog and poultry production.

20. *Beans.* Exclusive of a small area at Monkey River, the total acreage under Red Kidney Beans in the Toledo District was 365 acres. The crop is chiefly grown on hill land in the Indian Reservations. Rains in December 1956 spoilt a large proportion of the early planted beans used by the Indians for seed purposes, and again, during January and February, 1957, rain hampered the operation of burning fields for the main sowing. However, the crop of 207,067 lb. purchased by the Marketing Board, though less than in 1956, when conditions were ideal, was still very satisfactory.

21. In the Cayo District the cultivation of Red Kidney beans continues to be a gamble. January and February were very wet, with greatly diminishing returns to the farmers. Average yields were 5 to 1, or roughly 400 lb. per acre; and sales to the Marketing Board totalled 18,288 lb. as compared with 49,326 lb. in 1956, and 46,324 lb. in 1955.

22. Fields in the Northern Districts gave an average yield of 890 lb. to the acre.

23. Purchases by the Marketing Board in each District were as follows:—

TABLE III.

Cayo	..	..	..	..	..	18,288 lb.
Toledo	..	..	..	..	..	207,067 lb.
Orange Walk	..	..	..	..	..	100 lb.
						225,455 lb.

24. *Rice.* For the third year in succession rice production in the Toledo District showed an increase. A new grading system was introduced by the Marketing Board with higher prices offered for the cleaner and better grades of paddy. Total purchases in the Toledo District by the Marketing Board (1,357,284 lb.) and by private buyers (16,700 lb.), were 1,373,984 lb. as against 1,294,750 lb. in 1956.

25. Comparative figures of total purchases in pounds, by the Marketing Board for the last six years are as follows:—

1952	1953	1954	1955	1956	1957
726,838	640,132	617,167	1,003,547	1,294,750	1,420,588

26. More Toledo farmers are becoming interested in a new wet cultivation variety of paddy supplied by the Department of Agriculture. This is Century Patna. It matures earlier than BG 79, and does not tend to lodge as much as the BG 79. Yields, though slightly lower than BG 79, are still good, and make its cultivation attractive to farmers.

27. The Pilot Mechanised Scheme at Mussel Creek, which is financed under a C.D. & W. Grant, started production during the year and extremely good yields were obtained. Comments with regard to this Scheme are recorded in Part C herein.

28. *Bananas and Plantains.* Apart from the Waha Leaf Company's plantation at Waha Leaf Creek, there is at present no banana industry as such. Shipments by this concern amounted to 46,731 bunches as compared with 45,139 during 1956. Extensive spraying for leaf spot was necessary.

29. The widespread use of plantains as a cash crop and temporary shade in the newly planted cacao fields in the Stann Creek Valley has caused a boom in the production which may probably exceed local demand.

30. Sarteneja is the main producing centre for plantains in the Northern Districts. Over 30,000 bunches were harvested there and sold in the Belize and Chetumal (Mexico) markets during the year. Strong winds during November caused some slight damage to the crop in this area.

31. *Cacao*. Work on the lines originally planned in the C.D. & W. Scheme which was approved in 1955, was suspended in 1956 and expenditure under recurrent charges of the Scheme ceased as at 31st March, 1957. Expansion work in the Stann Creek Valley, which began in 1955 by the Humming Bird Development Company and by small farmers, continued.

32. The Agricultural Department, with funds provided from the local Estimates, supplied from its station in the Stann Creek Valley, 31,000 cacao seedlings to small farmers and enlarged its nursery facilities so as to be able to produce the 100,000 seedlings ordered by the farmers for the 1958 planting season.

33. Interest in the cacao cultivation has also been aroused in the Toledo District and a nursery with a capacity of 10,000 plants was prepared during the year at the agricultural Station in that district.

34. *Coconuts*. The annual production is now about three million nuts as compared with approximately eleven million in 1940. This large decline is mainly due to hurricane damage, but other factors have played their part, including lack of control of the industry, unstable prices, disease and insect pests, and non-use of fertilizer.

35. A Coconut Industry Board Ordinance was drafted and submitted to Government in May, 1957, but has not yet been enacted. A Secretary to the proposed Board was, however, appointed in October, 1956, and an office has been established in Belize. Temporary field Staff, numbering 3 in all, have also been employed and much useful field survey and instructional work has been carried out during the period under review.

36. *Root Crops*. The types commonly grown are cassava, coco, yam, and sweet potato. Cassava is a popular item of food among the Caribs who grow it in quantity in the Stann Creek and Toledo Districts, and manufacture starch for sale locally.

37. *Vegetables*. Vegetables were in fair supply at the beginning of the year but production fell off with the onset of the rainy season. Cabbages and tomatoes are the most popular items, but lettuce, cauliflower, egg-plant and kohlrabi are grown in smaller quantities. Local consumer demand is increasing, and there is need for the organised marketing of green vegetables in Belize.

38. *Broom Corn*. 30 acres of broom corn were planted in the Orange Walk area by a cooperative group of farmers who manufacture brooms for sale in the local markets. Efforts to sell their surplus production abroad unfortunately did not prove successful. Samples have recently been sent to New Zealand, where there is a possible market for this type of broom.

39. *Groundnuts*. Yo Creek in the Orange Walk District is at present the principal producing centre for groundnuts. 112 acres were planted there this year and yields averaged 900 lb. to the acre. The Marketing Board bought 1,465 lb. and the remainder was sold by the farmers to the trade. There were no exports. Attention is currently being given to expanding production of this crop in the San Jose Palmar, Chan Pine Ridge and Guinea Grass areas in this district.

LIVESTOCK.

40. *Cattle*. Cattle were generally maintained in fair condition, and largely because of the pasture improvement work carried out under the Livestock Subsidy Scheme, there were increased interest and efforts by livestock owners to provide better pastures for their stock.

41. The three sections of the scheme for the development of the cattle industry—

- (a) Pasturage Improvement;
- (b) Improved Breeding Stock;
- (c) Revolving Scheme for Bull Improvement;

which was started late in 1956 have achieved some good results. Under the first mentioned, 124 cattle farmers whose herds totalled 7,603 head, prepared 4,967 acres of additional pastures.

42. The second scheme, which provided for the payment of subsidies on imported breeding cattle, enabled 17 cattle farmers to introduce 80 head of breeding stock from abroad.

43. Twenty-two bulls were purchased by the Agricultural Department under the third scheme. The majority of them have been hired out on an annual basis to the smaller cattle farmers who could not qualify for assistance under the second scheme.

44. *Poultry.* Poultry and egg production also rose. There was a large increase in the number of day old chicks imported; the bulk of these, however, were not brought in for breeding purposes but for rearing and sale when three months old, in the local markets, for table purposes.

45. *Pigs.* With an improvement in the corn supply situation in the Toledo District, the Indians commenced building up their stocks of pigs. 1,752 were sold to the Belize markets as compared with 1,094 in 1956.

46. *Bees.* Farmers in the Corozal area have shown considerable interest in beekeeping and several new colonies were established at selected points all over the district. Results so far are encouraging and the industry is a promising one.

47. A small colony was introduced at Central Farm during March and thrived well but high winds on one occasion upset the hives and a large number of the bees were lost.

48. *Milk Production.* Sales of milk from the Cayo District to a private farmer near Belize, who had received loan assistance in 1954 to organise and establish a fresh milk supply for the town of Belize, ceased early in 1957 because of various difficulties.

MARKETING AND AGRICULTURAL CREDIT.

49. The Director of Agriculture was elected Chairman of the Marketing Board at the last statutory meeting of the Board held on December 27th, 1957.

50. The Marketing Board continued its policy of offering guranteed prices for rice, corn, red kidney beans, black eye peas and annatto. The Board also imported no less than 800 bags of certified red kidney bean seed for sale to farmers. Other items purchased at non-guaranteed prices included locally made brooms, cassava starch and groundnuts.

51. With effect from 1st November, the Extension Staff of the Agricultural Department were relieved of all responsibility for the collection of loans and the grading and purchasing of produce on behalf of the Marketing Board.

52. The Agricultural Credits Fund Committee of which the Director of Agriculture is a member, continued to function during the period under review. At the end of 1957 the position of the fund was as follows:—

Loans issued to 31.12.57 ..	\$350,106.63	Capital of Fund	\$500,000
Loans committed to 31.12.57 ..	13,304.20		
	\$363,410.83		
Less repayments to 31.12.57 ..	86,168.49		277,242.34
	\$277,242.34		
		Available balance	\$222,757.66

INCOME AND EXPENDITURE ACCOUNT.

Expenses		Income	
Finance charges	\$1,302.43	Interest and administration charges	\$32,484.35
Administration Expenses ..	5,093.83		
Incidental Expenses (Field Officers)	1,790.53		
Balance carried forward ..	24,297.56		
	\$32,484.35		\$32,484.35

53. During the period under review, a start was made in training field staff to administer the Credit Fund's activities. Messrs. W. A. Grant and S. B. Daniels were seconded from the staff of the Agricultural Department to the Agricultural Credits Fund and sent on a short course of training in the U.S.A. in Supervised Agricultural Credit. The course was arranged for through the good offices of the International Cooperation Administration. These officers, on their return to British Honduras in October 1957, assumed duty in the Northern and Cayo districts as Field Officers of the Agricultural Credits Fund. The Extension staff of the Agricultural Department will continue to assist with field inspections but will play no part in the actual paying out or collection of loans.

PRODUCER ASSOCIATIONS AND FARMERS GROUPS.

54. There were four producer associations in operation during the period under review. Two of these, the Corozal Cane Planters Cooperative Association Ltd. and the British Honduras Livestock Cooperative are registered cooperative societies with headquarters in Corozal and Belize respectively. The British Honduras Citrus Growers Association has its headquarters in Stann Creek. The Stann Creek Agricultural Development Association continues to show a keen interest in cacao, and, during the period, no less than 31,000 cacao seedlings were planted out by members of the Association. At the end of the year, orders placed with the Department of Agriculture for 1958 were in the region of 60,000 seedlings,

55. Farmers groups at San Narciso and Guinea Grass in the Northern Districts were again active. At the former village, some 90 acres of land have been established in Sugar Cane with a further 30 acres to be planted in 1958. At Guinea Grass, the group here has established 26 acres in pasture for cattle and 21 heifers were purchased at the close of the year. Plans have been made for the establishment of a further 20 acres of pasturage in 1958, and also the lining out and planting of 35 acres in coconuts, annatto, cashew and groundnuts.

56. The Cooperative piggeries established at five villages in the Corozal and Orange Walk districts have not proved a success. In most cases the pigs have been divided up among the members and each individual looks after his own pigs in a pen or pens allocated to him.

PART II

WORK OF THE DEPARTMENT.

A. STAFF

57. Mr. M. A. G. Hanschell arrived in British Honduras on the 24th September on transfer from St. Lucia, to fill the post of Director of Agriculture which had been vacant since November 1956 through the transfer to Sierra Leone of Mr. J. W. D. Goodban, O.B.E.

58. Mr. A. N. C. Thomas, Senior Agricultural Officer, acted as Director of Agriculture until the arrival of Mr. Hanschell.

59. Mr. C. A. S. Hynam, Agricultural Education Officer, left British Honduras during July on extended sick leave and was transferred to Barbados with effect from 1st February, 1958.

60. The Land Clearing Engineer, Mr. J. B. Hutchinson, proceeded on vacation leave in October and was on leave during the remainder of the year. Mr. E. D. S. Kemp was appointed to act as Land Clearing Engineer during Mr. Hutchinson's absence.

61. Mr. M. K. Chopin, Agricultural Officer, Toledo was on leave from July to December

62. The Veterinary Officer, Mr. J. H. Robins, left British Honduras in August on vacation leave, and resigned his post with effect from January, 1958.

63. Mr. E. G. Russell, who held the post of Agricultural Instructor, prior to proceeding abroad in 1953 for a degree course, was promoted as an Agricultural Officer in November 1956 on completion of his studies at the University of British Columbia, and resumed work with the Department in January.

64. Mr. G. M. Collins, Senior Agricultural Assistant of the Jamaica Department of Agriculture was seconded to this Department during the period 15th May to 30th September for work in connection with the Hurricane Janet Recovery Plan.

65. Up to the end of the year no replacement officer had been appointed to fill the post of Experimental Officer, which has been vacant since February 1956.

66. A Table showing the distribution of the staff at the end of 1957 forms Appendix III to this Report.

B. OVERSEAS TRAINING COURSES.

67. Mr. E. G. Russell, formerly an Agricultural Instructor in the Department of Agriculture returned to British Honduras in January after successfully completing a degree course in agriculture at the University of British Columbia. This course of training was awarded to him as a scholarship in 1955.

68. Mr. R. E. Jex, Foreman Mechanic, attended an instruction course in Mexico City on the servicing and maintenance of Ferguson tractors and equipment during the period 22nd February to the 4th March.

69. Mr. M. K. Chopin, Agricultural Officer, during the period 4th to 15th April, attended a course in cocoa budding techniques which was conducted in Jamaica at the school of Agriculture, Twickenham Park. The cost of the course was met from the West Indies Training Scheme.

70. Farm Demonstrator, M. W. T. Ebanks, who is employed on soil survey work, returned to British Honduras in May, after undergoing five months training with the Land Use Section of the Chemistry Division of the Agricultural Department in Jamaica.

71. A Technical Scholarship in Agriculture was awarded by Government to Mr. G. C. Ellis, a Trainee Farm Demonstrator. Mr. Ellis left British Honduras in September to take up residence at the University of British Columbia, Canada.

72. Farm Demonstrators E. F. Bautista and A. P. Bautista successfully completed a one year Diploma course at the Eastern Caribbean Farm Institute in Trinidad and returned to duty in July.

C. CONFERENCES.

73. Mr. A. N. C. Thomas, Senior Agricultural Officer, attended the 1957 Conference of B.W.I. Sugar Technologists which was held at Antigua during November.

74. Mr. F. F. Orio, Junior, Assistant Agricultural Officer was a member of the British Honduras delegation to the Second Latin American Conference of Leaders of Rural Youth held at San Jose, Costa Rica, in October.

D. AGRICULTURAL EDUCATION.

75. There were no full length courses at the Training Centre at Central Farm during the year. Mr. Hynam, the Agricultural Education Officer, was absent from the Colony on sick leave from July to the end of the year.

76. Facilities at the Training Centre were made use of for two courses arranged by the good offices of the International Cooperation Administration. The first was one on elementary surveying held in August and September for the benefit of the Junior staff of the Agricultural, Forestry, Public Works and Survey Departments, and from two private firms. Students received training for a period of five weeks.

77. The second course was one in agricultural extension methods which covered a period of a fortnight. This was attended by selected members of the extension staff of the Agricultural Department and three non-members. A feature of this course was the instruction of visual aids methods which was given by a visiting lecturer attached to the staff of the International Cooperation Administration organisation in Costa Rica.

E. EXTENSION WORK.

78. The arrival of an Agricultural Extension expert, in the person of Mr. P. H. Jameson of the International Cooperation Administration of the U.S.A., in June has now provided the Agricultural Department with an adviser on agricultural extension methods.

79. Since his arrival, Mr. Jameson has visited the principal agricultural districts on several occasions to become acquainted with staff, problems and the agricultural policy of each district. In November, Mr. Jameson organised the first agricultural extension course for district staff of the Agricultural Department.

80. During the period under review, the Extension Division of the Department contributed in no small way to the considerable expansion that has taken place in the Sugar industry in the Corozal district; the increased planting and production of rice in the Toledo district; and the planting of 100 new acres of Cocoa in the Stann Creek district. Location Ticket and Pasture Subsidy inspections again occupied the attention of the extension officers in all districts. Limited tractor hire services to farmers in the Stann Creek, Toledo, Cayo and Orange Walk districts, for cultivation purposes, were provided during the year.

F. DISTRICT AGRICULTURAL STATIONS.

81. *Stann Creek.* A large proportion of the time of the staff was devoted to the development of the cacao industry.

82. 31,000 cacao seedlings were delivered to planters in the Stann Creek Valley during the planting season, June to October, accounting for the planting of over 100 new acres of cacao. In the latter portion of the year work was carried out to expand existing nursery facilities so as to produce the 100,000 seedlings ordered by planters for delivery in the 1958 planting season. The three existing nursery sheds with a capacity of 15,000 each, were amalgamated so as to form one large shed of a capacity of 50,000, and a new shed of the same capacity erected. Another shed was also erected for use in the mixing of soil for filling pots, and an improved water supply was installed.

83. A very successful Cocoa Field Day was held at the Station in March to further stimulate the increasing interest in Cacao growing. This was attended by a large number of planters and other interested persons. Following the Field Day, visits by planters to the Station and requests by them for advice and assistance showed a marked increase.

84. Land inspections in connection with Location Tickets also took up a large portion of the time of the field staff. 104 location ticket holdings were inspected as compared with only 17 in 1956.

85. 20,263 citrus plants (including 500 for hurricane Janet rehabilitation work) and 733 mango plants were grown at the Station and sold to planters. Other types of economic crop planting material, food crops and ornamentals were also produced and sold.

86. *Toledo.* Work done by the Extension staff during the year included the inspection and giving advice on the layout of pastures for the Pasture Subsidy Scheme, discussions and practical assistance with laying out areas for cacao planting, lining up and taking levels for drainage on these areas, and on land being put out with coconuts; rehabilitation of old coconut plantations and inspection of location ticket holdings.

87. Demonstrations were given in budding and grafting various types of fruit trees, care of vegetable gardens and methods of planting ground provisions. Advice and help were also given in treating livestock for various complaints. Vaccination of poultry against Newcastle disease was carried out in several areas, and demonstrations of the castration of bulls and boars were also given. Farm Demonstrators also helped with the laying out, care and general maintenance of Scatter Plot Trials in their respective areas.

88. The cleaning of 100 acres of land at the Dump Rice Scheme was completed and the access road through the area was cleared as far as Crique Piedra. It was only possible to give the whole area one ploughing, and due to the shortage of equipment and early rains no harrowing was possible. Some 34 farmers took up 3 acres of land each for growing rice.

89. With a view to encouraging and initiating the cultivation of cacao in the district, a 10,000 plant seedling nursery was put down at the Station. The cacao seedlings will be sold to interested farmers at a subsidised price of 5 cents each provided the land is properly prepared to the satisfaction of the Agricultural Department. Three farmers began the preparation of about one acre of land each with shade and drainage under instruction from the extension staff. These plots will be used as Demonstration Plots by the Department and the seedlings will be given free of charge to plant out.

90. Through the joint efforts of the staff of the Agricultural and Forest Departments in the Toledo districts, three miles of telephone line were erected and the Station was linked with the main Belize-Punta Gorda line. The telephone has greatly facilitated the work of both Departments.

91. Towards the end of the year coconut nurseries were laid down at the Station using selected nuts from trees at Orange Point near Punta Gorda. The plants, when four months old, will be sold to farmers to be used as shade for new cacao fields and to start new plantations.

92. Details and results of fertilizer and variety trials with Corn and Rice carried out on the Station during the year are to be found under Section H.

93. *Orange Walk.* A new garden site for the production of vegetable seedlings for farmers was laid out during September and the sale of seedlings began during October. This step was taken to encourage the establishment of home vegetable gardens and to supplement the practice of selling seed in packets. It has found much favour with farmers. 103 dozen seedlings of cabbage, tomato and cauliflower were produced and sold up to the end of the year.

94. The grass plots of two acres each were established in the latter portion of the year and planted out in pangola and guinea grasses: a 100 % cover was obtained. A coconut nursery with a capacity of 2,000 seed nuts was also established during the same period, and is to be extended to accommodate 10,000 seed nuts early in 1958.

G. CENTRAL FARM EXPERIMENTAL STATION.

95. In addition to its function as the central experimental station, Central Farm is also the headquarters of the Agricultural Department.

96. A laboratory building was completed late in 1956 under a C. D. & W. Grant and the installation of its equipment was finished in 1957. The laboratory is under the charge of the Agricultural Chemist who is assisted by two Assistant Analysts (in training). In addition to the analysing of soil samples other forms of agricultural analyses are carried out.

97. The Public Works Department laid down a short metalled roadway to connect the main office with the Belize-Cayo Road. This has proven of considerable help to the public and to the staff who often had to walk through mud to reach the office building.

98. Accommodation for junior staff which is always acute, was somewhat improved by the renovation and enlargement of one junior quarter to house five bachelors. The expenditure for this was met from C. D. & W. funds.

99. The Anglican Mission which maintains a primary school at Central Farm erected an attractive new building of cement block construction to replace the former wooden building. The new school is now large enough to meet the requirements at Central Farm for some time to come.

100. Ploughing operations were commenced earlier than in 1956 so as to avoid late planting of corn. Although this prevented deep ploughing it had little if any deterrent effect on seedbeds and crop development due to the fact that the land had been deep-ploughed the year before.

101. The rotavator was used to advantage in the preparation of savannah land for the establishment of improved pasturage.

102. No further work was carried out during 1957 to prevent sheet erosion by the establishment of contour ridges, but it was observed that where these had been established over an 8 acre block of land cultivated in pigeon peas, no further erosion was noticeable.

103. The grass-arable rotation experiment covering an area of 56 acres was continued during the year. Eight acres of pigeon peas were harvested in July giving a total yield of 2,404 lb. or 300 lb. per acre. This crop does not at present appear to be well suited to the soils and climatic conditions on this Station.

104. Harvesting of 2 acres of Black Eye peas was carried out in December, yielding 1,467 lb. from 2 acres or an average yield of 734 lb. per acre.

105. 1.71 acres of yams were harvested in April—May. The Barbados and White Yam varieties out-yielded all others with yields of 8.2 and 8 tons per acre respectively. A further 3½ acres have been planted with the same 5 varieties, namely Carib, White, Yellow, Barbados and Chinese, with and without staking.

106. 6 acres of Cocos (Tannias) were planted in June. Harvesting of .68 acre of cassava was commenced in April and completed in July yielding 3.1 tons or an average yield of 4.4 tons per acre.

107. In spite of severe attacks of Army Worm (*Laphygma frugiperda*) in July necessitating resowing, a 6 acre block of Sorghum was established in July and cut for silage in September, giving some 400 tons of first quality silage.

108. 1½ acres of Bengal and Velvet Beans, and 1½ acres of Kudzu were also established in June and July respectively. Germination in all cases was excellent and an extremely good cover was maintained.

109. 1½ acres of Molasses grass (*Melinis minutiflora*), 1½ acres of Guinea grass (*Panicum maximum*) and 3 acres of Pangola grass (*Digitaria decumbens*) were also established during May, June and July respectively. 3 acres of Sweet grass (*Ixophorus unisetus*), and Coastal Bermuda (*Cynodon dactylon*) were established in November. 8 acres of a mixed sward of Pangola and Para was also established in October. Growth in all cases has been satisfactory in spite of the dry spell experienced in September and October lasting some 5 weeks.

110. Issues of planting material were:—

Citrus	3,124
Budded Avocado Pears	286
Grafted Mango	190

111. Sales from the vegetable garden and from economic and ornamental plants amounted to \$944.31.

112. In the dairy herd, 9 cows and 5 heifers yielded an average of 3,949 lb. and 2,914 lb. milk with average butter fat of 4.3 % and 5 % in an average of 219 and 197 days respectively.

Sales of dairy produce were:—

1,801 gallons milk at 60¢ per gallon	\$1,080.60
22 gallons cream at \$4. per gallon	88.00
237½ lb. butter at \$1. per lb.	237.50
Total revenue	\$1,406.10

113. At the end of the year, the herd consisted of 29 cows and heifers, 21 heifer calves and 7 bull calves—a total of 57 heads. A Jamaica Red bull is now the sire, the Jamaica Hope Jersey having been disposed of in accordance with a change of policy recommended by the Animal Health Adviser to the Secretary of State. The beef herd at the end of the year consisted of 80 animals as follows:— 2 bulls, 26 cows, 7 heifers, 36 steers, 6 heifer calves and 3 bull calves. Four (4) young Red Poll heifers were imported from the Republic of Honduras during the year and added to the beef herd. Five (prime) steers were sold for slaughter during the same period.

114. Pig-keeping has not been successful. The Berkshire breed has proved to be quite unsuitable from the point of view of rearing litters. The sows are very poor mothers. It has been decided to scrap this breed in 1958 and replace with the Large Black.

115. During the period under review, 81 pigs for breeding purposes were sold and 16 supplied to Group Piggeries in the Northern Districts as part of the Hurricane Rehabilitation Programme.

116. Revenue from the sale of 81 pigs amounted to \$1,219.93.

117. The flock of Barbados Black-Belly sheep at the end of the year totalled 15, and consisted of 2 rams, 9 ewes, 2 ram lambs and 2 ewe lambs. One ram was loaned to the Belize Estate and Produce Company's farm at Banana Bank, and one to the Village Council of Burrell Boom for breeding purposes.

118. The apiary, which had been expanded to 15 colonies during the first quarter of the year, due to a severe storm experienced on the night of 4th May which caused the loss of 12 colonies, consisted of only 4 colonies at the end of the year. Steps are being taken to replace the lost colonies.

119. In order to improve the standards of the servicing and repair work for the farm tractors and other departmental vehicles, the garage facilities at Central Farm were improved and new items of equipment provided. This resulted in greater efficiency of the vehicles and performance.

120. Appendix IV hereto sets out particulars of the Expenditure and Revenue of the Department under the various Heads.

H. AGRICULTURAL CHEMIST'S REPORT.

121. During the year the Agricultural Chemist has been performing the duties of the Experimental Officer in addition to his own. The Research Section of the Department is composed as follows:—

Chemistry Section

Laboratory— 2 Assistant Analysts
1 Laboratory boy

Survey 1 Soil Surveyor
1 Trainee Soil Surveyor

Field Experiments (This includes (a) Agronomic & variety trials
(b) Trials providing field data for
correlation with analyses)

Central Farm:— 1 Farm Demonstrator
4 Labourers

District work performed by H.Q. staff:—
1 Farm Demonstrator
2 Labourers

District work performed by district Agricultural Officers
Xaibe:— 1 Farm Demonstrator

Administration:— 1 Storeman—accountant (also records and correlates meteorological figures for the Colony).

122. *Laboratory Work.* The plumbing and electrical installation of the laboratory was completed in June 1957. A few pieces of equipment had still not arrived by the end of the year. Since June, efforts have been made to acquaint the Assistant Analysts with the techniques of agricultural analyses and to establish routine methods.

123. Routine methods have been tested and perfected for:—

(a) Feeds—crude protein: by Kjeldahl digestion and semi-micro distillation using Markham apparatus and boric acid.

- crude fibre: by normal acid and alkali digestion
- fat (ether extract): when feeds contain large quantities of fat—soluble colouring materials are also extracted by petroleum ether.

(Attempts using anhydrous aluminium oxide in a chromatographic column and eluting with petroleum ether or alcohol did not effect separation of fat from colouring materials. Since the carotene content was found to be very small, anhydrous calcium mono hydrogen phosphate is being tried to effect separation of xanthophylls and chlorophyll using petroleum ether as elutant. Work continues on this approach).

moisture:—gravimetrically and by Dean and Stark methods

ash: not used but to be done gravimetrically

(b) Milk —total solids: gravimetrically

—fat: Gerber

The following figures are for a mixed herd (of mainly local animals, some half-bred Jamaica Hope and a few Jamaica Red) at Central Farm.

Month	Fat				S.N.F.	
	average	range	average	range		
August 1957	4.6	2.8-6.9	9.0	7.9-10.1		
Sept. " "	4.7	3.4-6.8	9.2	8.1-12.2		
Oct. " "	4.7	3.0-6.3	9.1	8.2-12.2		
Nov. " "	4.7	3.4-6.2	8.7	8.0-9.3		
Dec. " "	4.4	2.2-7.2	8.9	7.9-11.3		

(c) Soils —Organic matter: Walkeley—Black method—Nitrogen (total): Kjeldahl digestion and Markham distillation

—Carbonates: The carbon dioxide is absorbed in caustic soda under vacuum (method of Tinsley, Taylor and Moore, Analyst 76,300 1951) and excess Na OH titrated under a protecting layer of petroleum ether after precipitation of carbonate with barium chloride.

(d) Soil and Plant Extracts—Phosphate: Using an adaptation of the Amidol blue method of Allen 1940 (Biochem. J. 34 B, 848), measuring colour developed with Unicam spectrophotometer. Accurate range 0.3—30.0 p.p.m. approximate results from 0.05—0.03 p.p.m. The effect of interfering ions is still being investigated.

—Chloride: using dichlorofluorescein.

—Manganese: by developing a permanganate colour with potassium periodate and measuring on the spectrophotometer. Accurate range 0.3

—500.0 p.p.m.

—Calcium and Magnesium: the methods of Cheng and Bray 1951 (Soil Sci. 72,449) using versenate (disodium dihydrogen ethylenediaminetetra—acetic acid) is still being adapted for use with extracts of biological materials. Investigations continue into control of pH and extent of interference due to phosphate.

—Potassium: this will be done by Flame Photometer when repairs to this instrument have been completed.

124. *Soil Survey.* The Soil Surveyor, W. T. Ebanks, returned in May from a 5 month course in Jamaica. During this course he worked, under officers of the Soil Survey Team of the Regional Research Centre, upon detailed soil surveying, classifying soils on a basis of profile, drainage, erodibility and fertility. He also worked with Land Capability and Farm Planning Officers of the Chemistry Department of the Jamaica Ministry of Agriculture and Lands.

125. W. T. Ebanks and H. A. Reyes attended and passed a 6 week course of Elementary Surveying held at Central Farm by Professor Wedder of International Cooperation Administration.

126. After a month spent collecting soil samples, about two months were taken up tracing detailed maps of the sugar cane areas, Corozal District on a scale of 20 chains to the inch. During the period September to December about 40 square miles were soil-surveyed in detail. A Trainee Soil Surveyor (A. Tzul) was employed to assist in this work.

TRIALS PROVIDING FIELD DATA FOR CORRELATION WITH ANALYSES.

127. On the basis of the Land Use Survey Report, eleven soil types have been chosen for immediate fertility studies. These soils are all extensive and agriculturally important. They constitute about 400,000 acres or 9% of the total area of the Colony, whilst their related soils comprise a further 7%. Corn trials (for study of phosphate and potash) and pangola grass trials (for study of phosphate only) are being laid down on each. Seven corn trials and seven pangola grass trials have been conducted and harvested during 1957. The pangola grass has responded very little to phosphate and on no soil type is the response statistically significant: plots which received an application of phosphate in June 1956 and no application in 1957 yielded on an average about two thirds as much dry matter during 1957 as plots which received applications in both 1956 and 1957. (See fig. 1) The percentage increase over control is, however, quite small. It is evident that pangola grass has a low capability of response to fertilizer.

FIG. 1. Curves showing response of PANGOLA GRASS to PHOSPHATE (The "Yield of DM" is the total of 42-day cuts from January to December 1957 averaged for trials on 6 sites)

(NOT PRINTED)

Phosphate application (lb. P2O5/acre)

These trials had a general dressing of 400 lb. sulphate of ammonia and 150 lb. muriate of potash during the year.

128. The corn trials did not respond very much to phosphate in this first year since many of them were sited on land which had not been cropped for several years. However, tentative response curves were obtained for five soil types (See Fig. 2).

Fig. 2.

(NOT PRINTED)

PHOSPHATE APPLICATION (lb. P2O5/acre).

The actual yields of dry grain are low, due partly to the low-yielding capacity of local corn and partly to a growing season which suffered from army worms (Lephyrgma) and from drought, particularly at germination, On only three of these five trials were the yielded responses significant statistically, viz.

Significances in Yield Response of Corn to Phosphate:—

Xaibe Clay:—

	P4	01	02	P3	03	04 P2 10	..	P1
P 5	01	02	03	04	05	06	..	+++
P 4	02	03	04	05	06	07	..	+++
P 3	03	04	05	06	07	08	..	+++
P 2	04	05	06	07	08	09	..	+++

Louisville Clay:—

	P4	P3	P2	P1
P 5			++	+++
P 4			++	+++
P 3			+	+++
P 2				

Toledo Clay Loam:—

	P4	P3	P2	P1
P 5	+	+	++	+++
P 4				+++
P 3				+++
P 2				+

AGRONOMIC AND VARIETY TRIALS

129. (A) PASTURE (1) Pangola Grass (*Digitaria decumbens*).

The curves given in Figs. 3, 4 and 5 are for established pangola grsss treated with 100 lb. per acre per annum muriate of potash and 50 lb. per acre sulphate of ammonia every 6 weeks (i.e. 400 lb. per acre per annum). Phosphate treatments were, as follows:—

- A No phosphate
- B 100 lb. per acre triple super (46% P205) in 1956 and 1957
- C 200 " " " " (46% P205) in 1956 only
- D200 " " " " (46% P205) in 1956 and 1957
- E 400 lb/acre triple super (46% P205) in 1956 only
- F 400 " " " (46% P205) in 1956 and 1957
- G 800 " " " (46% P205) in 1956 only

SOIL	TYPE SITE	YIELD (LB D.M./ ACRE/ ANNUM X10 2)							
		C	B	C	D	E	F		
Stopper	Stann Creek	..	220	245	229	238	279	247	258
Puletan	Hector Creek	..	105	127	119	13	122	133	141
Barton	Central Farm	..	196	219	230	211	215	205	224
Pixoy	San Jose	..	233	242	232	254	209	265	255
Louisville	San Narciso	..	172	208	208	218	198	239	212
Xaibe	Xaibe	..	154	158	182	197	189	197	188

130. The high average D.M. content of pangola grass (overall average 34%) is seen from the following table (each figure is an average percentage for 28 plots):—

S.ITE	MONTH											
	M	J	J	A	S	O	N	D	J	F	M	A
Stann Creek	..	64	30		25	22	20	24	58	25		30
Hector Creek	..			33	34		37	35		27	44	
Cen ral Farm	..		49	26	38		29	25		23	29	50
San Jose	..	59		32	67		24	35	27			30
San Narciso	..	41		32	33		26	31	25	34	33	36
Xaibe	..			30	27		25	33	47			36

131. It would appear from Fig. 3 that the pangola grass in Stann Creek (which has a comparatively well-distributed rainfall) and Central Farm (which experiences low night temperatures during November to January) undergoes a lull in its growth during the short days. At Central Farm, however, the growth during the long days in May is not quite as prolific as in June and July when the rains begin.

132. Fig. 5 shows that the yield of pangola grass in the Northern Districts varies in proportion to the rainfall. Even the August "maugre" season causes reduced growth. The soil at Xaibe is particularly shallow and droughty.

133. The growth of pangola grass at Hector Creek is governed mainly by rainfall, but some reduction in yield occurs in December and January, probably due to low temperatures and short days.

134. It will be realised that curves are based on the 1957 yields only and that the rainfall during 1957 was 10—20% below average. However, the indications are that supplementary feed is required, since the off season carrying-capacity is 50% or less of the maximum season occurs during the dry weather and supplements would need to be in the form of silage hay or irrigated pasture. In Stann Creek, and to some extent in Belize and Cayo Districts, an alternative grazing species would probably be needed during November to January.

Pangola Grass on the Pine Ridge.

135. (1) (a) A fertilizer trial laid down on deep Puletan soil was clipped on 10th October, 1956, i.e. after 14 weeks. The average yields of fresh material from four replicates were:—

Treatment		Yield	
NPK		5,490	lb. per acre
NPK	Lime	3,640	
NP		5,200	" " "
NP	Lime	2,700	" " "
PK		1,640	" " "
PK	Lime	1,640	" " "
P		1,190	" " "
P	Lime	1,590	" " "
O		480	" " "

Significance	NP	PK	P	O
NPK		+++	+++	+++
NP		++	+++	+++
PK				
P				

Lime does not reduce yields significantly.

136. A fertilizer trial was laid down on 11th December, 1956 on established pangola grass on deep Puletans soil. Clippings were made on June 3rd, 1957, July, 19th, 1957 and 9th December, 1957. Assuming that the phosphate in this second application left a 50% residue in the soil, the average yields over six replications and the costs are, as follows:

Treatment	Yield fresh material	Cost Fertilizer per 100 lb. fresh material
N.P. = 0:40	5,900	25¢
13:40	7,000	26¢
32:40	9,200	24¢
64:80	19,100	23¢

It is doubtful whether the high phosphate content in the fourth treatment was properly utilized. Assuming 80% utilization by an animal, then 1 c w—day would correspond to about 100 lb. fresh clipped material. If this produced 1½ lb. L.W.i., the cost per lb. would be about 16¢ for fertilizer alone.

137. A fertilizer trial was conducted on shallow Puletan soil using established pangola grass. A standard dressing per acre of 80 lb. N. per year was applied in 6-weekly dressings of 10 lb. N. per acre each. This elicited much greater growth as shown by the following figures (means of 4 replicates) for 6 weekly clips during 1957:—

<i>Treatment</i>	<i>Yield fresh material</i>	<i>Cost fertilizer per 100 lb. fresh material</i>
80—0	31,400	5.7¢
80—40	38,000	5.9¢
80—80	41,100	6.6¢
80—160	39,800	9.0¢
80—(80)	35,800	6.3¢
80—(160)	36,700	7.4¢
80—(320)	42,200	10.7¢

Bracketed figures indicate phosphate applied every year. Last applied June 1956.

138. The increments of phosphate cause very little response and the cost of producing the grass rises accordingly. Nevertheless, the cost was far less than when smaller and less frequent application of nitrogen were made. Another trial is being laid down to investigate the growth response to fertilizer applications in the range.

N=40 to 100
P=40 to 80
cost per acre=\$15 to \$35

139. (2) Sweet Grass(Ixophorous unisetus). Clippings were taken at 6-week intervals from plots of 25 square yards each, with five replications of each treatment in a randomised block. The yields and statistical significances are as follows:—

<i>TREATMENT</i>		<i>YIELD OF D.M.</i>	
<i>No. dressings</i>	<i>lb/ac per dressing</i>	<i>Fertilizer</i>	<i>(lb./acre/annum)</i>
0	0	0	7,875+525
2	300	Sulphate of Ammonia	9,502+1,744
2	100	Muriate of Potash	1,0512+1,325
2	200	Triple Super	10,917+1,588
2	600	Complete	14,231+1,555

STATISTICAL SIGNIFICANCE.

	P	K	N	O
NPK	+++	+++	+++	+++
P			+++	+++
K			+	+++
N				+++

140. The yield distribution curve for the year is shown in Fig. 6 hereunder. Fertilizer was applied on this 5 year old pasture in May and October. There is a distinct response to the rains in June—July and October—December, but it also appears that growth is much greater in the short days. Contrary to general belief, sweet grass does not flourish under conditions of bad drainage. It is a very succulent grass judging by the low D.M. content (overall mean 17.2%) viz:

MONTH	FEB.	MAR.	MAY	JUNE	JULY	SEPT.	OCT.	NOV.	DEC.
%D.M.	16	15	17.5	16	17.5	22	18.5	17.5	15

Fig. 6: SWEET GRASS, 1957.

(NOT PRINTED)

141. (3) Jaragua grass (*Hyparrhenia rufa*). A trial was commenced in July 1957 to compare the yields obtained when clippings are carried out at the intervals of 4 weeks, 7 weeks and 9 weeks. Each treatment is replicated 12 times. On this layout are super-imposed three fertilizer dressings (nitrogen alone, complete fertilizer and control). The important conclusion to be drawn so far is that jaragua grass appears to take one or two weeks to produce any appreciable re-growth after being clipped. Thus the yields of D.M. to date are as follows:—

Clipping interval		4 weeks	7 weeks	9 weeks
Period of measurement		29	28	27
Yield D.M. lb/acre	Control	5,602	8,935	8,390
	Nitrogen	4,755	8,796	9,198
	Complete	5,367	7,878	8,337

Half the plots are clipped at 2" above ground level and half at 5" above ground level: so far there is no apparent difference in yield or % D. M. Average % D. M. contents can be seen from the following table, each figure in which is the mean of 24 valves (overall mean 30.8%).

MONTH	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
%D.M.	28	32.5	25	34	35	30

So far no response to fertilizer has been observed.

142. (4) Guinea grass. (*Panicum maximum*). A simple fertilizer trial with four replicates was laid down in August 1957, and clippings were taken at 6-week intervals. The yield for the first three harvest are as follows:—

TREATMENT (lb./acre)			Mean Yield of D.M. lb/acre/18 weeks
<i>Sulphate of Ammonia</i>	<i>Triple Super</i>	<i>Muriate of Potash</i>	
0	0	0	3,581
0	100	0	5,255
200	0	0	6,196
200	100	0	8,767
200	100	70	8,194

Month	Sept.	Oct.	Nov.
% D.M. (mean of 20 plots)	31.5	30	28

143. (5) Other Economic Grasses—

(a) Para Grass (*Panicum Muticum*). Measurement of yields from this grass under various fertilizer treatments has proved difficult because regular low clipping thins out the sward and smaller prostrate grasses very rapidly invade. However, there is a distinct visible response to both nitrogen and phosphate. Para grass has the reputation locally of putting flesh on to a beast.

(b) Elephant grass (*Pennisetum purpurum*). Even with regular dressings of fertilizer, only very low productivity has been obtained from elephant grass when grazed.

(c) Buffel Grass (*Pennisetum ciliare*). Two types of U.S. origin have been tried; one is an erect tall quick-growing grass of short longevity and the other a short; but erect grazing type. Their usefulness remains to be seen, but palatability is certainly low.

(d) Coastal Bermuda Grass (*Cynodon dactylon*) has been imported during 1957 from Jamaica and now occupies a 3 acre field. It is more difficult to establish than pangola grass and slow to thicken up.

(e) Molasses Grass (*Melinis Minutiflora*). Slow to return after cutting and obviously has little use on the fertile heavy soils at Central Farm.

(f) Kudzu (*Pueraria thunbergiana*). Although it takes 12 months to establish a cover, kudzu forms an effective cover crop. Based on the success achieved in Toledo District, it is hoped soon to try grazing a pure standard kudzu.

144. (6) Introduction Plots.

(a) Lucuntu Grass (*Ischaemum timorense*). This forms a dense hardy sward although growth is rather slow. The seed is not always viable. A 4 acre has been planted to be grazed with sheep.

(b) Toco Grass (*Ischaemum aristatum*). This species is slower growing than Lucuntu grass, and does not so far appear to have any value in British Honduras.

(c) Rhodes Grass (*Chloris gayana*). Rhodes grass looks well in the cool part of the year, but is not palatable and tends to seed early. A 4 acre has been seeded to observe its growth during the dry weather.

(d) Blue Panic (*Panicum antidotale*). A soft, quick growing grass, but does not tiller or compete with other grasses.

(f) Guatemala Grass (*Tripsacum laxum*). This does not yield nearly as much as elephant or guinea grasses.

(g) Bengal beans. Bengal beans give an excellent cover but last only about 8 months. They are suitable for planting any time after August, if they are to give a cover well into the dry season.

(h) Sword Beans. These are too erect to form a good cover crop.

(i) Pigeon Peas. Form a good 1-year cover crop if broadcast at about 20 lb. per acre. As a 2-year cover, they need to be bushhogged to spread the seed at the end of the first dry season. The cover does not regenerate if grazed.

145. (B) Sugar Cane. (1) The following trials, laid down in 1956 and 1957, will not be ready for harvest until early 1958 or later:—

Fertilizer trials	5
Variety trials	3
Cultivation trials	2

146. (2) Five new varieties were imported during 1957 from the B.W.I. Cane Breeding Station, Barbados, and are being multiplied by a system of separating individual tillers. The imported varieties are—

B	4,744
B	47,419
B	49,119
B	50,112
B	52,298

147. (3) Chemical weedkiller trial. The following treatments were put upon replicated plots of POJ 2878 in January 1957. The weeds were 6—8 weeks old. Killing such large weeds is a common problem in B.H.

- Treatment: (1) Ester 2,4-D at 1½ lb. acid equivalent per acre
 (2) Ester 2,4,5-T at 1½ lb. acid equivalent per acre
 (3) Ester 2,4-D at 2½ lb. acid equivalent per acre
 (4) Ester 2,4, 5-T at 2½ lb. acid equivalent per acre
 (5) Ester 2,4-D and Ester 2,4,5-T at 1½ lb. acid equivalent each per acre.
 (6) Ester 2,4-D at 1½ acid equivalent per acre plus Pentachlorophenol weedkiller (Kanex) at ½ gallon per acre and Diesel oil at ½ gallon per acre.
- The general conclusions were—
- (a) Treatments (3) and (4) were no more effective than (1) and (2).
 - (b) There seemed to be very little advantage in treatment (5) over treatment (2).
 - (c) The pentachlorophenol was more effective against monocotyledonous plants than 2,4,5-T.
 - (d) Damage to individual weed species was:—

Weed	2,4-D	2,4,5-T	2,4-D + Pentachlor
Annuals			
Wild eggplant	+++	+++	+++
Cow nettle	+	++	++
Marigold	++	+++	+++
Malva sp.	+	+++	+++
Haulback	+	+++	+++
Regenerating Roots			
Spondias Mombin	+++	+++	+++
Pixoy (Wild Bay cedar)	+++	+++	+++
Cojeton (Thevetia Gaumeri)	+	+++	+
Bacal Che (Orange wood)		+++	
Grasses			
RK (Rice Grass)			++
(Imperator cylindrica)	+	+	++
Swamp Grass (Cyperus sp.)		++	+++
Kan Chim			+++
Razor Grass (Cyperus sp.)		+	++
+ Slight damage ++ Considerable damage +++ Killed			

<i>Treatment</i>	<i>Cost per acre for spray material</i>
1	\$3.00
2	5.80
3	6.00
4	11.60
5	8.80
6	5.48

148. The most effective spray in absence of grass weeds appears to be 2,4,5-T at 1½ lb. acid equivalent per acre.

149. (C) Corn. (1) Central American Corn Breeding Programme. A total of eleven types of yellow corn (2 hybrid, 9 open-pollinated) and twenty-one types of white corn (5 hybrid and 15 open-pollinated) were tested in three replicates of approximately 30 square yards each. The corn was sown 1' x 3' (i.e. 14,520 plants per acre) and 150 lb. per acre of mixed fertilizer applied. Despite drought and attacks by Army Worm (*Laphrygma*), considerable information was obtained. A summary follows:—

<i>Variety</i>	<i>No. of days to flowering</i>	<i>Yield (lb. per acre of 82% D.M. grain)</i>
<i>Yellow corn</i>		
Rocol H-202	61	2,090
Rocol H-203	61	2,440
E.T. O. Amarillo	62	1,920
Corneli II	60	2,410
Corneli 31	59	3,070 +
P.D. (M.S.) 6	61	2,040
Corneli 54	62	2,400
Amarillo Salvadoreno	58	2,610
Dorado de Tiquisate	58	3,410 +
Amarillo de Cuba	60	3,100 +
Francisco flint	58	2,430
<i>White Corn</i>		
Rocamex H-501	62	3,140 +
Rocamex H-502	63	3,450 +
Rocamex H-503	63	4,380 +
Rocamex H-504	62	3,780 +
Rocame V-520-C	61	1,220
Baio V.S.-5	55	3,090 +
Raton	57	1,610
Llera III (S. Juan)	57	1,730
San Andres Tuxtla	61	1,910
Bejuco	64	5,970 +
Taveron	56	2,500

<i>Variety</i>	<i>No. of days to flowering</i>	<i>Yield (lb. per acre of 82% D.M. grain)</i>
Empalizada	56	2,130
H-1	57	2,070
1-451	60	2,030
Venezuela 3	62	1,920
Sicarigua	63	1,970
Rocol H-151	62	3,500
Rocol H-251	60	2,140
Rocol V-351	60	2,230
Rocol V-101	63	2,550
Columbia 2	63	1,660

150. The variety testing programme will be repeated in 1958 and the ten varieties marked with an asterisk (*) will be tried on a larger scale. It is hoped that by earlier planting, and with less damage from Army Worm and drought, the good varieties will have a better chance of demonstrating their propensities.

151. (2) Ear-to-Row Breeding. Selections from the 1956 ear-to-row breeding was done on the basis of

- (a) high yield per acre of 1956 parent
- (b) high number of stalks with two ears (where applicable)
- (c) Finally only heavy cobs were chosen. The corn was sown as single seeds 1' apart in 3' rows on fertilized land. Average area of each variety was 80 square yards.

The results were:—

1956 1957						
Variety	Cob No.	Cob Wt. (ozs)	Yield/ac. lb/grain	Cob No.	Cob Wt.	Yield ac. lb/grn
Coolshade	1	10.0	3,245	3	8.0	1,636
	2	8.3	2,837	1	9.0	1,168
				2	8.5	2,069
				3	8.0	896
				4	8.0	4,050
	3	11.0	3,343	3	8.0	1,277
				4	8.0	562
	4	8.3	2,438	1	9.0	1,518
	5	8.3	2,454	1	10.0	555
	7	8.3	2,767	1	8.0	1,171
Cayo District	1	7.0	1,970	1	9.5	2,228
	4	8.3	2,757	1	9.0	11,193
	5	11.0	2,161	3	9.0	2,082

*Further tests will be done in 1958.

152. (3) Other varieties. Two hybrids (Dixie 18 and Funks G-737) and two open-pollinated varieties of U.S. Origin were tested at Central Farm each on an area of 220 square yards. They were planted 1' apart in 3' rows and given 150 lb. fertilizer per acre.

The yields were as follows:—

Calhoun Red Cob	..	..	..	..	1,900 lb. grain per acre
White Tuxpan	..	..	..	..	1,180 " " " "
Dixie 18	..	..	..	..	950 " " " "
Funks G—737	..	..	..	..	2,230 " " " "

153. (4) Spacing trials. In a trial with 18 plots of 85" square yards each, the yields of various plant spacings in 3' rows were as follows:—

Spacing	lb. grain per acre	% of maximum
6"	1,022+42	95.8
9"	1,066+39	100.0
11"	953+42	89.3
15"	912+28	85.5
19"	765+36	71.7
24"	670+36	62.8

Significance	6"	11"	15"	19"	24"
9"	..	..	..	..	..
6"	..	..	..	..	..
11"	..	..	..	..	..
15"	..	..	..	..	..
19"	..	..	..	..	..

+ Significant at $p = 0.05$ level
 ++ Significant at $p = 0.01$ level
 +++ Significant at $p = 0.001$ level

Late planting (25/6/58) and dry conditions caused the low yields. With a better growing season, the optimum spacing may well be eleven or even fifteen inches. It was observed on another site that corn with 2 plants per hole, with holes 12" apart, out-yielded a stand with 1 plant per hole at the same spacing.

154. (D) Soyabeans. Variety and spacing trial. Six varieties of soyabeans, together with Black Eye Peas as control, were planted on 10th June 1957. Two row spacings were used (18" and 24") and seeds put 2 in hole with holes 6—8" apart. The plots were 10 yards $\times$ 4 yards excluding guard rows, and there were 6 replicates. Mean yield figures in lb. per acre were:—

Variety	18"	21"	24"
Black Eye Peas ..		720	570
Jackson ..	715		628
Lee ..	574		635
C.N.S.	563		386
JEW 45 ..	966		1,057
Roanoke ..	604		529
Improved Pelican	755		686

Improved Pelican grows 3 ft. high and requires 24" rows. It is later-maturing than the other varieties, bears pods all the way up the stems and forms a dense cover. It would make a good silage crop. JEW 45 grows about 2 ft. high and would cover in if planted in 21" rows. It is a notably better yielder than the other varieties. All the beans ripen together and there is no shattering. It might improve the condition of the beans after threshing if the plants were defoliated with sulphuric acid prior to harvest. JEW 45 would probably outyield Black Eye Peas consistently when planted in May or June, and does not have the disadvantage of Black Eye Peas which require two or three harvestings. The other four varieties would require 18" rows.

This trial was repeated at a September sowing, but the shorter days obviously did not suit the crop and yields were very small.

155. (E) Forage Sorghum Variety Trial.

(1) Three varieties were sown on 10th June 1957 on fertilized land at Central Farm in plots 27 $\times$ 12 yards with 5 replicates. Harvesting was done on 18th August 1957 (9 weeks when the seed-heads were shooting on Red Top and Atlas. The yields, which were not significantly different, were:—

Variety	Yield Green Material (lb. per acre)
Honey Seeded Ribbon ..	71,700 + 6,100
Red Top Sugar ..	57,500 + 15,600
Atlas ..	53,450 + 7,800

(2) The same varieties were planted at Orange Walk on 23rd May 1957 in plots 7x7 yards with only 2 replicates. The plots were harvested on 20th August 1957, The mean yiled figures were:

Variety	Yield Green Material (lb. per acre)
Honey Seeded Ribbon	78,800
Red Top Sugar	35,600
Atlas	31,900

100 lb. per acre Sulphate of Ammonia was applied and a second cut made on 8th November, 1957 (i.e. a growth period of 11 weeks). The mean yield figures were:—

Variety	Yield Green Material (lb. per acre)
Honey Seeded Ribbon	35,300
Red Top Sugar	28,600
Atlas	18,100

(3) The same three varieties were planted in plots 12x10 yards, with five replicates, on 13th September 1957 at Central Farm. The trial was fertilized with 200 lb. per acre of sulphate of ammonia. The weather was rather dry and the forage sorghum seed-heads were in the milk stage when harvested on 22nd November 1957 (9 weeks). The mean yield figures from the five replicated were —

Variety	Yield Green Material (lb. per acre)
Honey Seeded Ribbon	20,800
Red Top Sugar	27,600
Atlas	33,200

156. (F) Coconuts. The number of fertilizer trials has been increased from three to six during 1957.

(1) Fertilizer trial. Consejo Soil. This trial was begun in June 1954 on 6-month old palms. The trial consists of eight treatments replicated nineteen times on single-palm plots. A little damage was done in September 1955 by Hurricane Janet but most palms recovered. The owner has given the cocal no attention except for occasional brushing. Height measurements in September 1957 gave the following results:—

Treatment	Height of Palm (feet)
O	4.6 1.6
K	4.9 2.1
NK	4.9 1.9
N	5.2 2.7
P	6.5 1.8
NP	8.3 2.8
NPK	8.3 3.6
PK	8.8 3.3

i.e. NP treatment receives 125 lb. per acre.

O—Control

N—2 lb. per palm Sulphate of Ammonia per year

P— $\frac{1}{2}$ lb. per palm Triple Super per year

K—1 lb. per palm Muriate of Potash per year

Significance	NPK	NP	P	N	NK	K	C
PK ..	..	..	++	+++	+++	+++	+++
NPK ..	..	..	+	+++	+++	+++	+++
NP ..	..	..	+	+++	+++	+++	+++
P ..	..	..	..	..	..	..	+
N ..	..	..	..	..	..	..	..
NK ..	..	..	..	..	..	..	..
K ..	..	..	..	..	..	..	..

The response to phosphate is clear but the interactions between phosphate and nitrogen and also between phosphate and potash are hard to explain.

(2) Fertilizer Trial Stann Creek. In an attempt to assess the growth of the palm before yielding commences, measurements are now being made for:—

H=height of palm in feet

L=length of an average lower leaf in feet

These measurements are taken by an observer standing at the next palm (30 feet away) using a previously calibrated L-shaped stick, one end of which is held against the chest. Then volume of tree is proportional to HL²

Measuring the volume brings out the difference between small palms which have a single central leaf and palms which are genuinely large.

157. A trial on coconuts at Stann Creek was measured in this way in April 1957. The trial was laid down in 1954 on stunted 4-year old palms; it consists of eight treatments replicated three times on a single trees. The soil is a slow-draining, acid, old terrace, low in fertility. The volumes are as follows:—

Treatment	Palm Volumes (cu. ft.)	
NPK ..	467	193
P ..	370	173
PK ..	350	222
NP ..	322	140
NK ..	68	47
O ..	61	85
N ..	57	17
K ..	56	12

O—Control

N—1 $\frac{1}{2}$ lb. per palm Sulphate of Ammonia twice per year

P—1 " Triple Super

K— $\frac{1}{2}$ " Muriate of Potash

Significance	P	PK	NP	NK	C	N	K
NPK ..	..	..	..	++	++	++	++
P ..	..	..	..	+	+	+	+
PK ..	..	..	..	+	+	+	+
NP ..	..	..	..	+	+	+	+
NK ..	..	..	..	..	..	..	..
C ..	..	..	..	..	..	..	..
N ..	..	..	..	..	..	..	..
K ..	..	..	..	..	..	..	..

A similar set of trees in the same cocal were given the same treatment but with an overall dressing of 2 lb. per palm of lime. The lime appears, but not significantly, to have slightly reduced growth.

Another and larger trial on rather similar land in Stann Creek was laid down in late 1956. Measurements made in November 1957 showed growth to be improved by NP and NPK but not significantly.

158. (G) Weed killers:—

(1) Black Eeye Peas: The effect of DNOSBP (Dow Premerge) Dinitro ortho secondary butyl phenol) at two concentrations was tried upon weeds in black eye peas. The plots which were separated by a single guard row, were 4 rows wide and 6 yards long. Each treatment was replicated four times. The treatments were:—

- O— Control
- e— 5 pints DNOSBP per acre in 30 gallons water at cotyledon stage
- E— 10 " " " " " " " " " " " "
- I— 5 " " " " " " " " " " " "
- (2 weeks later)
- L—10 " " " " " " " " " " " "

Spraying was done during September in fairly dry weather when the dew had dried off the leaves. Treatments I, L and E damaged the beans badly, although I and E recovered to some extent. Treatment e did not damage the crop but gave poor control of monocotyledonous weeds; broadleaf weeds (which were in a minority) were killed.

It appears that about 8 pints per acre of Dow Premerge applied at the cotyledon stage might give an economic weed control.

(2) Natural Pasture: In an attempt to improve the botanical composition of a natural pasture at Central Farm two rows of plots were treated with increasing doses of 2, 4-D from 1 to 5 pints per acre and 2, 4, 5-T from 2 to 6 pints per acre. Both 2, 4-D and 2, 4 5-T formulations contained 5 lb. of acid equivalent per gallon. Half of each row of plots overlapped to observe the effect of 2, 4-D 2, 4 5-T together. Spraying was done in cool dry weather.

159. The conclusions from this preliminary trial are:—

- (a) 2, 4-D, even at 1 pint per acre only, killed soft weeds (mainly small legumes in this case) but, when used in conjunction with 2, 4, 5-T did not enhance the latter's weed-killing powers.
- (b) Sensitive weed (*Mimosa pudica*) was badly damaged by 4 pints per acre of 2, 4, 5-T but required 5-6 pints per acre for a kill.
- (c) Broom-weed (*Sida acuta*) and cockspur (*Acacia Cookii*) were only about 50% killed at 6 pints per acre of 2, 4, 5-T.
- (d) Since sensitive weed, broom-weed and cockspur are the most common and most troublesome weeds in natural pasture, it seems necessary to use 6-8 pints 2, 4, 5-T per acre. This, at current prices, would cost between \$17.00 and \$23.50 per acre for material alone. It is doubtful whether natural pasture is worth such expenditure.

160. (H) String Bean: Two varieties supplied by the Asgrow Export Corporation, U.S.A. were tested. The first batch planted in June 1957 grew very poorly and failed to produce any pods. A second seeding on 15th October 1957 grew better in the cooler weather. The following are the yields from beds of 21 square yards each.

Variety	Yield (fresh pods)
Asgrow Tenderlong 56539	7 lb.
Asgrow Tenderlong 56889	9 lb.
Kentucky Wonder	15 lb.
Black Eye Peas	21 lb.

161. (I) Rice—Fertilizer Trials. Various replicated trials in Toledo on BG 79, B.H. Creole (Upland) and Century Patna indicate slightly significant responses to both phsophate and nitrogen.

162. (J) Xaibe Experiments. The object of the work here is to find crops and methods of cultivation suitable for the shallow, droughty, phosphate-deficient soils. Trials have been carried out on corn varieties, peanut varieties, bean varieties, sugar cane, plantain, sweet potato, coco-yam, castor oil, pigeon peas and soyabeans. Conclusions up to 31st December, 1957 have been:—

(a) All crops need phosphate fertilizer. Response for most crops is considerably greater from 90 lb. P 205 per acre than from 45 lb.

(b) Plantain, sweet potato, coco-yam, beans and peanuts do not do very well.

(c) Pigeon peas grown for seed production are not economic, partly due to a bushy stunting which affects many plants.

(d) The indications are that, with suitable varieties and fertilizer, corn may be an economic crop. Despite drought and bird damage, two Mexican hybrids yielded:

H501	..	..	..	..	1,750 lb. per acre
H505	..	..	..	..	1,450 lb. per acre
local	..	..	..	..	800 lb. per acre

(e) A variety trial and a fertilizer trial on sugar cane have been laid down. Phosphate is the limiting nutrient and it appears that good response is obtained up to 90 lb. P 205 per acre.

(f) Castor oil is growing well and does not suffer from the grey mould which affects the flowers on the plants at Orange Walk and Central Farm. It would appear that earlier planting is desirable (about 1st October).

163. Work continues with sugar cane, corn varieties, coconuts, annatto, and pangola grass. Bengal beans, pigeon peas, sweet grass and Kudzu are being tried as restorative crops.

I. MUSSEL CREEK RICE PILOT SCHEME.

164. Weather conditions. The weather at Mussel Creek for 1957 had its unusual features. January and February were very wet with a total of 11.84 inches of rainfall. The dry season of March through May was about normal with 5.27 inches of rain.

165. The summer rainfall was also near average. Rains started on June 3rd and 31.40 inches had fallen by the end of September. The heaviest daily precipitation was on June 21st when 4.85 inches fell. There was a noticeable "maugre" season as only 4.20 inches of rain were recorded in August.

166. The greatest departure from average conditions was the period of October through to January 1958 where only 15.25 inches of rainfall were recorded, whereas about 40 inches is normal for those four months. A summary of weather data is given in Table I

TABLE I

Month	Rain fall	Ave. Temp. 8.00 a.m.		Ave. Temp. 2.30 p.m.	
		Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb
January	7.41	70.4	72.6	72.8	79.4
February	4.43	72.1	73.9	74.2	82.0
March	2.66	72.5	76.4	74.8	85.2
April	0.29	75.5	81.7	75.9	85.4
May	2.32	77.3	82.8	78.1	87.9
June	11.44	78.0	83.1	78.9	87.2
July	8.58	77.3	81.4	77.7	85.7
August	4.20	78.0	82.4	78.5	86.8
September	7.18	77.9	80.8	78.5	85.5
October	5.00	73.9	77.0	77.7	84.6
November	3.72	74.8	77.2	75.4	82.7
December	4.94	69.5	70.8	72.7	77.7
Total	162.17				

167. Surface water levels. There were unusually late floods in January—February. The Belize River had a flood crest of 37.3 feet (above mean sea level) on the 23rd of January and one of 27.0 on the 12th February. Mussel Creek was out of its banks most of both months with crests at Sebastian Bridge of 20.2 on the 25th of January and 18.6 on the 13th of February.

168. There were two major floods during the rainy season. In late July the Belize River reached 27.6 feet at Bermudian Landing and 3.6 feet at Boom Ferry. On October 31st a crest of 35.5 feet at Bermudian Landing and 6.2 feet at Boom Ferry was recorded. The levels of Mussel Creek at Sebastian Bridge at the respective times were 19.6 and 18.2 feet.

169. Mussel Creek contained sufficient water for irrigation of 80 acres in the savannah planted in April. On occasions run-off from upper fields accumulated in the savannah when the creek was high. This was not deep enough to injure the rice there, but when a new pump is installed this water may be pumped onto the higher fields with a resulting saving of reservoir water.

170. Water was released from the reservoir on the Station during January—February to keep it at a safe level because of unsettled condition of the embankment. Evaporation during the dry months was six to seven inches per month. More than enough water was held to flush 70 acres in late May. The remainder was used on the savannah fields. The water stored from the June—July rains was largely used in the fall and winter as a result of the unusual dry weather of that period.

171. Field Work. With the completion of most of the development work for the rice pilot project large scale production was possible in 1957. A bulldozer was used 552 hours, mostly on clearing work. As a result, 179 acres was planted at various times during the year. The system in use of a reservoir, a pump, ditches, canals and flood protection embankments allowed full control of surface water. Overall average yields were not as high as hoped for, but the information obtained on soil and crop management should lead to higher yields in the future. An example of the effect of different practices is given in the next paragraph.

172. Difference in Savannah Fields. There was a considerable difference in the yield of rice from the two fields with identical soils. The variables which might have caused this are listed below. Some loss of stand occurred on Field A-2 because of the long period required to get the water on and off when flushing more than 60 acres. This can be improved upon. The plants of this field were practically stripped of leaves by army worms when they were about three weeks old. Spraying for such a heavy infestation as this will probably pay. A fertilizer test on A-2 indicated no response to nitrogen, phosphate or a combination of the two. A rain storm occurring just as Field A-1 was mature caused about two-thirds of the field to lodge severely resulting in considerable harvest loss. Thus, even with the stiff-strawed American varieties it may not be wise to attempt to obtain extremely high yields. This year's experience reveals the potential rice yields on these soils and also the importance of careful management.

173. Yields. In 1957 the first sizeable acreage was planted. From 143 acres no less than 269,000 lb. paddy were harvested, or an average yield of 1881 lb. per acre. This crop was sold to the Marketing Board, realizing \$19,689.

174. Weeds and Grass. A water-loving weed, *Jussiaea suffruticosa*, was present in large numbers in fields B-1 and B-4 which were flushed to germinate the rice seed near the close of the dry season. Spraying by hand was tried and proved to be very satisfactory. One man could cover about 12 acres in eight hours including time to refill his sprayer. A low volume of $1\frac{1}{2}$ gallons per acre was used to keep pumping and refilling to a minimum. 2, 4D in the amine form at the rate of one pound (acid equivalent) per acre was applied and resulted in the complete killing of this weed. A few other weeds were not killed, but these grew only on the levees and apparently were killed by flooding. In a separate pre-emergence spray test one pound of 2, 4D per acre greatly reduced the stand of rice. There was no apparent damage, though to the rice on B-1 and B-4 which were sprayed at about eight weeks.

175. Frequent rains occurred after ploughing field B-2 in August. Disking after the rains killed the young weeds which were germinating. As a result, weeds were no problem after planting to rice in late September.

176. A species of *Cynodon dactylon* which spreads by runners and which with stands submergence is found in the savannah. It was particularly vigorous in poorly drained areas. When the field was ploughed it was too wet and a poor job of turning the soil was done. It is believed that this grass can be killed by good ploughing when the land is quite dry.

177. Disease. No diseases were observed to affect the rice in the savannah. However, the fungus disease blast or "rotten neck" (*Piricularia oryzae*) was widespread on the cleared land ("B" fields). Field B-1, which had been in rice once previously, had much less damage this year as compared with the first year. It was worse on the September-sown crop. These two facts—infection on new land and during cool weather—are in accord with findings elsewhere. Seed treatment with Arasan of rice sown in a previous year seemed to have been of little benefit. The severeness of the infection varied markedly within a field. It was greatest on areas that were originally wet or poorly drained, in some cases the rice dying out completely. Flooding of the rice itself, though, seemed not to have an effect one way or the other.

178. Previous small plot tests indicated that nitrogen increases the injury; phosphate at 40 lb. of P205 per acre may decrease the injury slightly; and potash at 40 lbs. of K20 or lime at 2,000 lb. per acre have no effect. Variety tests indicate that Bluebonnet 50, Century Patna 231 and B.H. Creole are the most resistant of varieties tested. Rice grown on areas where brush windrows were burned or on levees was generally less affected. The fact that this cleared land is more infected than small farmer milpa fields cannot definitely be explained.

179. The serious new disease, Hoja Blanca, which has reportedly done much damage in Cuba and Venezuela has not been observed in this country.

180. Field Insects. As mentioned previously, army worms (*Laphygma Frugiperda*) caused damage in the savannah in May and June. However, no infestations occurred on later crops though there have been attacks on late plantings in previous years.

181. Rice stink bugs, (*Solubea pugnax*), appeared in small numbers in rice maturing in late July but increased to such large numbers that in November they were doing considerable damage. In late January 1958, when rice on B-2 was maturing not a single bug could be found there or on volunteer rice on harvested fields. This unexplained absence of insects is something worth investigating if and when an entomologist is recruited to the staff of the Agricultural Department.

182. Tractors and Machinery. The rice fields were tough and sticky when the clay soils were wet and very hard and often full of ruts when dry. This indicates the need for large tractors such as the 55 horsepower ones being used. It was necessary to equip one of the tractors with steel wheels and spade lugs for all ploughing. The tractor with 18" x 26" rubber tires generally was able to pull the rice buggy. It would be desirable to have more clearance under the center than these tractors provide. All tractor equipment worked satisfactorily with nothing unusual to report.

183. The combine harvester with 15" x 28" rubber tires worked reasonably well on the savannah even when there was standing water. However there was difficulty harvesting the cleared fields when they were soft. It was necessary to delay harvest in some cases and impossible to harvest some poorly drained areas. More land levelling will improve the surface drainage of these fields, but combines on tracks will probably be advisable for the future.

184. There was only one serious delay because of breakdown of equipment. This was on the combine, and though an order was cabled for a replacement part to be sent air express three weeks were required to obtain it. It is hoped that this service will improve. The waiting for this part and the waiting for the fields to dry resulted in delayed harvesting and was a major reason for the low yields of fields B-1 and B-4.

185. Varieties, Fertilizer and Seeding Dates. Previous variety trials have indicated that Bluebonnet 50, Century Patna 231 and B.H. Creole are superior to some 40 odd varieties tested. In many cases the other varieties may have done poorly because of their lack of resistance to the blast disease, therefore it may be advisable for further trials to be carried out. The British Guiana varieties, though high yielders, lodged too easily to be useful for combine harvesting. Five new varieties have been imported recently from British-Guiana for trial.

186. Tests of three varieties, Bluebonnet, Century Patna and B.H. Creole at various times of the year showed no significant difference when planted in early June though B.H. Creole grew too tall for easy harvesting. When planted in late July, Bluebonnet 50 yielded significantly higher. An October date of seeding test has not been harvested yet. It is apparent that all varieties do not grow as tall when planted later in the year. There is considerable evidence, though not conclusive, that yields become progressively lower as the date of seeding advances from April to October.

187. Fertilizer trials showed no significant response from nitrogen at up to 64 lb. of N per acre or phosphate at up to 80 lb. of P205 per acre or a combination of the two on the heavy soils. On the lighter soils approaching the pine ridge type of land 40 lb. of P205 increased the yield in one trial from 1015 lb. to 1785 lb. of rice per acre. Additional amounts of phosphate or phosphate with nitrogen provided no further increase. Previous trials have shown no response to potash or lime on either soil.

188. Rotations. No extensive experiments with rotations have been carried out as the small plot area was only established this year. As the land is relatively flat with poor internal drainage it will be difficult to grow other crops during the rainy season. Pasture is probably the most suitable alternate crop and would be most likely to improve rice yields. With this in mind, some grass tests have been established on the rice soils as well as on the adjacent pine ridge land.

189. Dallis grass (*Paspalum dilatatum*) has shown the most promise on the clay soils, particularly on the poorly drained portions. Sweet grass (*Xophorus unisectus*) does well on better drained parts. Both of (these grasses were propagated by seed. Pangola (*Digitaria decumbens*) may be fair on better drained parts, but has been found difficult to establish by cuttings on a large scale. It is relatively easy to establish on the pine ridge soils and does well if the land has drainage and is adequately fertilized. A 15 month's test here has indicated that 1 lb. of N and 1.3 lb. of P205 will produce about 250 lbs. of Pangola (green weight) on the pine ridge at rates up to about 100 lb. of the element per year per acre.

190. Drying and storage. As the amount of rice harvested at any one time was relatively small it could be dried to below 15 percent moisture in the storage bins at the Station. Some rice which was picked up out of the water contained more than 25 percent moisture, it was dried using unheated air with no damage from mould. The average amount of gasoline used in the blower engines while drying was 0.14 gallons per 100 lb. Some rice remained in the bins for four months at about 14 percent moisture. It was kept in perfect condition by aerating once a month on cool dry days.

191. Good sanitation and periodical spraying with Dieldrin has reduced the bran bugs and rice weevil population to nil. Angoumois gran moths build up to considerable proportions while rice is in the bins. No other stored grain insects have been observed.

192. Economics. As more was learned about the physical and economic factors with respect to growing rice by mechanization in British Honduras it became apparent that a large investment and experience management would be required to develop the acreage necessary to meet the country's consumption. It is estimated that it will require \$125 per acre for land-clearing, roads, ditches and canals; \$203 per acre for machinery, buildings, irrigation pumps and structures, and \$65 per acre for operating costs to grow a 2,000 lb. per acre crop, or a total outlay of \$393 per acre based on a 1,000 acre unit. For a smaller unit the outlay per acre would be greater and probably less for a larger one.

193. Since, in the costings, provision is made for depreciation of machinery, buildings etc. the average investment per acre over several years would be half the total outlay. Also the outlay for operating costs is spent throughout the year so the average investment for this would be about half the total. On this average investment of \$259 per acre at 2,000 lb. per acre of rice there would be a profit of \$26.23 or a return of 10.1 percent. At a 3,000 lb. per acre yield the average investment is only slightly higher, \$260.50 per acre, and the profit would be \$84.73 or a return of 32.5 percent. Details of estimated costs of production based on the limited experience of the pilot scheme are given in Table IV.

TABLE IV.
ESTIMATED COSTS OF RICE PRODUCTION ON A 1,000 ACRE UNIT

	Per Acre
1. Machinery, depreciation	\$28.61
2. Grain storage and handling, depreciation	.90
3. Irrigation facilities, depreciation	2.10
4. Land-clearing, roads, ditches, canals	+
5. Fuel and oil, field work and irrigation	10.40
6. Repairs and maintenance, parts only	7.51
7. Labour	12.00
8. Seed	6.75
9. Weed Spray	1.50
10. Fertilizer	10.00
11. Supervision	11.00
12. Drying to 17% moisture and transport	6.00
13. Total cost	96.77
14. Selling price of 2,000 lb. at \$6.15 per 100	123.00
	\$26.23

‡No charge is made for land-clearing and earth-moving as this is considered to be a permanent improvement to the land.

TABLE IV, Concluded

13A. For 3,000 lb. per acre crop an additional cost of \$3.00 for drying and transport ..	\$99.77
14A. Selling price	184.50
15A. Gross Profit	84.75

194. *Future of Scheme.* It was the intention of the Department to carry on this rice work only during the initial investigational phase, and then allow development by private individuals. Because of the large investment and experience required, production by small farmers along these lines is not feasible. It was at first hoped that local interest might result in the formation of a corporation using local capital to do further development. With this in mind a field day and tour of the Station was held in May for Business and Government representatives. Nothing developed from this, however, and as there was interest shown in the project by several visiting Americans it has been decided to offer the project together with an additional 5,000 acres of adjoining land for sale to outsiders. An advertisement has accordingly been inserted in the Rice Journal of the U. S. A.

J. VETERINARY OFFICER'S REPORT.

195. The Veterinary Officer, Mr. J. H. Robins, M.R.C.V.S., left the Colony on 28th August on vacation leave and subsequently resigned from the Service. The post remained vacant for the balance of the year.

196. *Horsekind:* There was no case of Glanders diagnosed or suspected during the year. General health of all horsekind appeared to be reasonably good.

197. *Cattle:* Infective warts continued to be a problem, but incidence was somewhat sporadic. In all cases treatment with Lithium Antimony Thiosulphate 6% solution was effective.

198. *Swine:* No cases of swine fever or other diseases were observed.

199. *Poultry:* New Castle Disease broke out in February in the area near Stanley field Airport, in Orange Walk, Corozal and the town of Belize in March. Control was effected by ring vaccination. Extensive vaccination was also carried out in the Stann Creek and Toledo districts as a precautionary measure. 30,400 doses of vaccine were expended in these campaigns. Odd cases in the town of Belize occurred during April and May. In July, another outbreak occurred in San Antonio, Toledo district but was successfully controlled by ring vaccination.

200. The Veterinary Officer was also engaged on Pasture subsidy inspections and instructions to farmers on fencing methods layouts etc, throughout the first 8 months of the year.

K. LAND CLEARING UNIT.

201. The Land Clearing Unit, consisting of two D-8 Caterpillar tractors, two D-7 Caterpillar tractors and two D-4 Caterpillar tractors with ancillary equipment for clearing and cultivation, was fully employed throughout the year.

202. The two D-8 tractors have required considerable repair and maintenance work to keep them going and it is no longer possible to place any reliance on these Units. Provision has been made in the Development Plan Part III for their replacement in 1958 with the two new D-7 Caterpillar tractors. One of the D-8 tractors was stationed in the Toledo district until July. There it cleared and ploughed about 126 acres of land at the Dump area for rice cultivation, and constructed an earth road through the area. In July, this Unit was removed to Mango Creek to assist the Forestry Department with road construction work until November when this was completed and the Unit was moved to Maskall on the Belize-Corozal road for further land clearing work on a privately owned estate.

203. The remaining D-8 tractor was employed at Maskall on land clearing operations throughout the year.

204. One D-7 tractor and two D-4 tractors were employed on clearing 583½ acres of high bush for cane cultivation at Santa Cruz, Corozal district throughout the year.

205. The remaining D-7 tractor was employed on land clearing and embankment construction operations at the Mussel Creek Rice Station throughout the same period.

206. In November, a Marden brushcutter was imported and added to the equipment strength of the Land Clearing Unit for use with a D-4 tractor in clearing 3 to 4 year-old huamil. The new brush-cutter can clear up to one acre per hour of this type of bush.

207. The bulk of the work done by the Land Clearing Unit was on clearing land for sugar cane in the Corozal district. The total acreage cleared for all types of crops and pasturage during the year was 878½ acres as compared with 648 acres in 1956. Revenue accruing from land clearing operations amounted to \$34,041.12.

L. VISITORS.

208. His Excellency the Governor visited Central Farm on the 9th of May. There were a number of other visitors during the course of the year including:—

Mr. F. Kennedy, Assistant Secretary, Colonial Office;
Mr. J. Shelsky, of the F.A.O. Unit in Bacalar;
Mr. A. P. Evans, from the Crown Agents;
Mr. C. H. Brown, Cotton Officer, British Guiana;
Dr. F. Reynolds, Plant Pathologist of the I.C.A.;
Messrs. R.W.R. Foley and I. Beaverhouse of the Citrus, Costing Mission;
Mr. Hunt, from General Post Office, London;
Miss Queenie Shootes, of F.A.O.;
Mr. Cashah, of F.A.O.;
Mr. Reyes of the World Bank;
Mr. G. B. Excel, Butchery and Flaying Expert of Colonial Development and Welfare Organisation, Barbados;
Mr. R. S. Marshall, C.B.E., Animal Health Adviser to the Secretary of State for the Colonies;
Mr. D. H. French, O.B.E., Pasture Expert, Colonial Office.

M. LEGISLATION.

209. Ordinance No. 15/1957, entitled the Animals (Control of Experiments) Ordinance 1957, was passed on the 16th August for the purpose of controlling experiments on living animals which are likely to cause pain to them. A minor amendment to this Ordinance was later made by Ordinance No. 15/1957 passed on the 20th December.

210. Five Statutory Instruments were passed under the Contagious Diseases (Animals) Ordinance in connection with outbreaks of New Castle Disease of Poultry. No. 16 of 1957 passed on the 6th March declared the Corozal and Orange Walk districts to be infected areas and prohibited the movement of poultry out of or into the two districts. The Belize district was later declared an infected area under S.I. 17 of 1957, passed on the 11th March.

211. The prohibition of the movement of poultry in the three infected districts was varied on the 23rd April *vide* S.I. No. 26 of 1957 which authorized the movement of poultry under the terms of a permit issued by the Director of Agriculture.

212. The three Statutory Instruments Nos. 16, 17 and 26 of 1957 were revoked on the 28th August by S. I. 39 and 40 of 1957.

213. Statutory Instrument No. 37 of 1957 entitled the Rabies Control (Belize) Regulations which were made on the 21st August, provided for the compulsory inoculation of all dogs in the town of Belize against rabies.

N. ACKNOWLEDGMENTS.

214. The Director wishes to express his sincere appreciation of the very good work put in by a much depleted staff during the year, and also to the many farmers who have co-operated with the Department in the promotion of much needed trials and demonstrations on their lands.

M. A. G. HANSHELL,

Director of Agriculture.

Central Farm.

5th July, 1958.

TABLE I
SUMMARY FOR RAINFALL FOR 1957.

Districts and Stations	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1957	Total Average 1956 10 years
Corozal														
1. Corozal Town ..	5.88	6.51	1.70	.01	.80	7.67	3.28	1.01	4.73	4.66	31.73	27.12	39.99	47.62 48.50
2. Corozal Agstat ..	3.76	4.32	1.12	.05	1.17	9.53	.76	3.16	6.03	3.49	3.01	1.84	38.24	42.55 50.06
3. Louisville ..	3.74	3.21	1.74	.70	1.17	5.60	2.26	3.28	4.72	3.08	3.58	1.96	35.04	51.39 54.13
4. Pembroke Hall ..	4.98	2.89	1.96	.43	1.11	9.75	3.26	2.48	4.71	2.49	1.66	2.03	37.75	48.42 N.A.
Orange Walk														
5. Orange Walk Town	2.93	4.91	1.18	1.06	2.50	6.13	7.04	2.54	5.26	5.07	2.12	3.50	44.24	43.39 38.57 (B)
6. Orange Walk Agstat	4.13	4.55	1.05	1.05	3.30	6.69	6.20	2.50	5.03	4.99	2.09	3.22	44.80	N.A. N.A.
7. Gallon Jug ..	6.60	2.84	1.95	.18	2.57	4.73	8.22	3.76	5.16	3.06	6.33	5.56	50.96	65.15 51.80
8. Freshwater Creek ..	11.13	12.63	.49	.40	3.24	6.50	11.93	14.02	17.04	2.60	4.10	5.29	89.37	126.06 74.59
9. August Pine Ridge ..	6.68	9.68	10.14	7.68	8.30	9.20	9.00	7.19	7.00	3.55	5.45	5.05	88.92	44.14 N.A.
10. Hill Bank ..	6.17	3.73	1.66	N.A.	2.99	7.71	9.81	2.59	4.76	4.32	4.34	6.09	54.17	N.S. N.A.
Belize														
11. Belize Town ..	9.02	4.59	.80	0	.71	5.91	6.52	2.05	10.44	9.95	1.94	5.57	57.50	90.91 68.95
12. Salt Creek ..	8.81	3.99	3.09	0	1.51	6.19	10.26	2.14	6.87	5.00	4.12	7.31	59.29	68.87 31.93 (C)
13. Gracie Rock ..	10.14	4.22	1.07	.87	2.21	14.47	12.02	3.73	9.15	4.16	6.22	6.90	75.16	87.65 40.90 (C)
14. Maskall ..	6.32	8.12	4.00	.15	2.95	5.97	6.10	4.48	7.55	4.44	2.88	2.61	55.57	58.18 N.A.
15. San Pedro A.C. ..	7.96	5.76	3.20	.08	.67	3.25	2.43	.95	15.14	5.18	.82	6.35	52.09	61.91 22.95 (C)
16. Stanley field ..	8.17	3.73	1.97	0	2.22	9.69	6.93	2.44	8.45	6.22	2.63	4.71	57.16	N.A. N.A.
17. Lucky Strike ..	8.05	6.59	N.A.	N.A.	N.A.	4.10	10.98	3.23	4.66	N.A.	3.02	3.30	N.A.	73.49 N.A.
18. Rice Station ..	7.41	4.43	2.66	.29	2.53	11.44	8.58	4.20	7.18	5.00	3.72	4.94	62.17	75.21 N.A.
19. Gales Point ..	10.45	5.66	4.22	1.15	2.14	14.08	6.27	5.43	6.98	5.22	4.85	5.38	72.23	N.S. N.A.
Cayo														
20. Cayo Town ..	5.88	6.45	1.46	.57	4.16	7.01	5.47	1.90	9.64	9.56	8.72	13.82	59.64	56.51 35.61 (B)
21. Central Farm ..	6.23	5.33	2.85	1.41	4.16	5.17	6.33	2.29	6.79	5.70	10.72	4.96	61.94	61.57 49.76 (A)
22. Listowel ..	6.30	4.55	2.86	1.00	3.98	5.14	6.47	2.97	4.96	3.45	5.67	2.76	50.11	60.12 40.32 (B)
23. Augustine Pine Ridge	3.10	2.46	1.19	.69	4.01	5.16	3.21	6.96	10.48	13.25	2.99	6.05	59.55	60.48 43.28 (B)

APPENDIX I (Paragraph 5) (Continued)

TABLE I
SUMMARY FOR RAINFALL FOR 1957

Districts and Stations	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total 1957	Total 1956	Average 10 years
24. Benque Viejo	5.86	3.06	2.88	.19	1.87	4.99	4.32	4.18	7.26	7.44	8.37	7.89	58.31	58.69	26.88 (C)
25. Roaring Creek	9.69	6.62	4.72	1.20	3.26	8.28	13.11	5.80	7.43	.19	9.93	6.50	79.73	88.07	41.36 (C)
26. Sibun River ..	13.10	11.88	6.90	3.05	5.19	9.52	19.36	8.90	10.38	2.45	12.57	11.46	114.76	N.S.	N.A.
27. Millionaire Camp	4.21	5.67	2.41	4.70	6.77	5.95	5.01	3.97	5.66	6.80	3.48	5.20	59.83	N.S.	N.A.
28. Norland ..	5.33	5.61	2.84	1.20	4.06	3.69	6.13	2.12	6.70	6.22	8.96	4.18	57.04	57.35	30.46 (C)
29. Caves Branch	10.79	9.27	3.84	1.69	3.24	9.87	15.50	7.50	6.63	2.93	12.27	5.01	88.54	N.S.	N.A.
30. Never Delay ..	10.06	6.37	1.75	0	2.83	8.20	12.49	5.48	6.02	5.32	4.25	5.49	68.26	N.S.	N.A.
Stann Creek															
31. Stann Creek Town ..	7.92	7.14	3.16	.08	1.52	3.93	6.04	4.40	9.63	7.51	4.10	5.52	60.95	N.A.	69.45
32. Stann Creek Agstat	10.73	8.16	4.50	.43	1.98	6.44	6.86	9.87	10.06	5.46	4.62	6.47	75.58	94.23	81.52
33. Cow Creek Farm ..	14.33	12.87	4.32	.31	5.40	20.80	16.54	8.07	11.26	4.56	7.71	7.22	113.39	117.70	76.76 (B)
34. Alta Vista ..	12.36	13.03	3.53	.52	4.57	16.55	12.61	6.12	11.66	4.45	8.39	6.53	100.32	122.68	54.19 (C)
35. Middlesex ..	13.44	10.82	3.75	1.39	3.95	13.98	19.81	9.15	10.93	3.60	8.40	5.82	78.48	119.80	102.73
36. Melinda ..	10.59	8.52	4.40	.12	2.54	8.33	9.15	7.21	11.06	5.80	4.96	7.87	80.53	107.10	62.94 (B)
37. Pomona ..	11.32	12.33	2.71	.55	3.34	12.03	11.18	7.08	9.01	4.76	7.48	6.26	88.05	96.80	47.41 (C)
38. Mango Creek ..	6.56	7.33	1.39	.43	3.39	18.37	12.93	1.21	6.81	6.33	10.35	4.45	79.55	N.A.	N.A.
39. New Farm ..	14.90	13.25	4.72	.46	5.53	21.54	17.14	9.14	11.84	4.99	8.27	7.60	119.38	136.90	61.86 (C)
Toledo															
40. Punta Gorda Town	9.48	8.48	3.33	2.52	4.15	16.31	33.55	30.69	16.64	8.07	14.60	6.91	154.73	157.55	149.86
41. Punta Gorda Agstat	9.56	8.97	.56	3.89	.25	17.79	35.96	23.94	16.28	10.50	9.07	4.21	140.51	150.35	124.72
42. San Antonio ..	9.48	6.46	3.59	1.32	4.41	11.28	26.17	17.75	9.72	12.59	3.79	2.41	108.97	120.10	N.A.
43. Barranco ..	11.18	5.70	9.84	7.33	4.95	15.68	39.73	30.80	11.86	5.51	15.10	5.71	163.39	185.62	84.55 (C)
44. Hunting Caye	10.11	2.06	4.69	.29	4.24	N.A.	14.21	7.94	9.00	11.28	12.26	15.36	91.43	N.A.	N.A.
45. Crique Sarco ..	14.71	8.72	3.14	9.28	4.78	16.79	58.64	N.A.	21.42	10.54	18.06	7.23	151.89	228.01	N.A.
46. Machaca Camp ..	10.47	5.93	3.56	2.83	3.86	15.26	23.39	21.52	11.04	10.31	7.66	6.37	122.20	N.S.	N.A.
47. Monkey River ..	4.03	5.47	3.00	0	5.57	18.13	10.89	10.34	16.08	N.A.	N.A.	N.A.	73.51	N.A.	N.S.

NOTE: A=8 years B=7 years C=5 years O=No records N.A.=Not available N.S.=New station

APPENDIX II

AGRICULTURAL COMMODITY IMPORTS 1955, 1956 & 1957 CUSTOMS DEPARTMENT FIGURES

Commodity	Unit	1955		1956		1957	
		Quantity	Value	Quantity	Value	Quantity	Value
Cattle for Breeding ..	No.	40	14,382	18	11,861	58	31,887
Cattle for Slaughter ..	No.	13	1,339	4	500		
Poultry ..	No.	6,764	1,662	6,861	5,655	29,294	10,269
Swine for Breeding ..	No.	—	—	—	—	4	240
Butter ..	x 100 lb.	1,944	157,901	807	64,077	1,384	100,232
Butter Substitutes ..	x 100 "	3,611	105,267	4,303	114,966	4,474	146,090
Cheese ..	x 100 "	2,381	127,750	1,923	104,030	2,838	158,862
Cocoa, prepared ..	x 100 "	484	37,023	342	34,934	440	35,086
Coffee—ground ..	x 100 "	293	44,489	227	37,686	178	56,275
—substitutes ..	x 100 "	1	74	8	1,079	2	333
Eggs, fresh ..	x doz.	22,013	16,375	44,346	28,028	82,467	50,294
Fish, canned or bottled ..	x 100 "	937	36,229	738	27,665	1,041	38,919
Rice ..	x 100 "	26,640	179,167	3,424	21,083	26,447	303,940
Flour ..	x 100 "	111,601	727,836	26,208	282,012	28,623	712,505
Dried Beans, R.K. ..	x 100 "	11,026	22,186	102,084	606,155	110,708	89,038
Other Kinds ..	x 100 "	1,561	23,700	210	4,184	5,335	27,547
Lard & substitutes ..	x 100 "	9,366	230,690	6,850	96,175	1,791	346,940
Beef in Barrels ..	x 100 "	1,649	52,655	11,602	267,806	13,352	37,124
Pork in Barrels ..	x 100 "	1,926	64,302	2,261	60,970	1,267	107,277
Meat canned or bottled ..	x 100 "	2,771	141,627	2,434	70,649	3,430	158,771
Hams and Bacon ..	x 100 "	652	54,700	3,227	139,672	3,911	73,673
Milk— condensed ..	x 100 "	22,163	499,977	662	49,603	978	584,336
— unsweetened ..	x 100 "	11,089	212,169	24,789	559,278	34,634	157,956
— powdered ..	x 100 "	3,799	137,197	5,055	109,402	6,649	58,032
Sugar— refined ..	x 100 "	9,643	65,845	7,051	191,709	3,565	57,603
Spices ..	x 100 "	236	18,390	18,117	137,442	5,550	16,801
				153	10,473	211	

APPENDIX II (Continued)

AGRICULTURAL COMMODITY IMPORTS 1955, 1956 & 1957 CUSTOMS DEPARTMENT FIGURES

Commodity	Unit	1955		1956		1957	
		Quantity	Value	Quantity	Value	Quantity	Value
Vegetables—onions ..	x 100 lb.	4,966	40,260	4,923	43,907	7,757	55,330
potatoes ..	x 100 "	10,312	69,778	6,993	59,375	10,414	66,400
garlic ..	x 100 "	183	4,195	107	1,977	142	3,897
Other fresh ..	x 100 "	1,094	16,767	926	13,006	805	15,137
Canned or bottled ..	x 100 "	1,702	39,782	1,702	37,956	11,832	43,410
Tobacco— Unmanufactured ..	"						
Black Leaf ..	x 100 "	39,427	32,665	31,395	27,831	27,477	24,204
Other ..	x 100 "	54,166	54,538	64,903	47,356	58,959	51,440
Cigarettes ..	x 100 "	60,952	147,170	50,400	116,886	50,282	123,699

AGRICULTURAL COMMODITY EXPORTS 1955, 1956 & 1957 CUSTOMS DEPARTMENT FIGURES

Bananas ..	x bunches	20,873	33,930	47,154	73,258	43,342	60,690
Plantains ..	x 100 lb.	49	33	4,699	2,313	6,791	1,364
Citrus Grapefruit, fresh ..	x 100 "	29,495	117,172	13,933	55,087	142	306
Grapefruit Juice ..	x 100 "	31,557	289,989	30,782	300,660	9,674	96,747
Grapefruit Segments ..	x 100 "	35,223	441,507	61,643	1,009,037	46,349	713,361
Grapefruit Concentrate ..	x 100 "	395	9,046	2,761	75,666	2,083	58,506
Grapefruit Oil ..	x 100 "	74	12,280	51	13,038	14	3,397
Oranges fresh ..	x 100 "	153	295	1,955	6,261	1,739	6,502
Oranges Concentrate ..	x 100 "	45	1,350	1,110	298,110	5,809	265,909
Orange Juice ..	x 100 "	8,133	75,637	40,765	598,063	10,515	143,929
Orange Oil ..	x 100 "	95	6,128	273	19,501	206	14,943
Pineapple, Canned ..	x 100 "	379	8,588	—	—	—	—
Other fresh fruit ..	x 100 "	86	295	873	2,802	272	1,517
Fruit Pulp ..	x 100 "	617	3,970	2,569	18,041	—	—
Dried Beans, Red Kidney ..	x 100 "	1,353	24,367	360	7,920	—	—
Vegetables, other ..	x 100 "	5	20	52	527	134	794
Maize (Whole grain corn) ..	x 100 "	9,271	36,452	125	605	1,241	2,123
Sugar, unrefined ..	x 100 "	46,567	333,751	41,619	298,310	135,022	1,175,852
Eggs, fresh ..	x doz.	67	41	—	—	—	—

APPENDIX II (Continued)

AGRICULTURAL COMMODITY EXPORTS 1955, 1956 & 1957 CUSTOMS DEPARTMENT FIGURES

Commodity	Unit	1955			1956			1957		
			Quantity	Value		Quantity	Value		Quantity	Value
Coconuts	.. x 100 nuts	..	18,248	96,252		4,311	34,540		10,393	54,403
Copra	.. x 100 lb.	..	1,917	16,975		3,440	29,818		1,017	9,886
Cohune kernels	.. x 100 "	..	5,378	48,353		5,164	46,665		8,463	80,414
Ramie, fibre	.. x 100 "	..	382	10,283		—	—		—	—
Alligator Skin	.. x 100 "	..	13,681	34,562		6,907	21,556		7,162	25,602
Fish, fresh	.. x 100 "	..	25,985	4,782		33,536	5,086		58,728	9,762
Fish, dried	.. x 100 "	..	33,369	7,318		56,090	11,797		51,672	8,794
Lobsters— whole	.. x 100 "	..	60,865	16,610		34,388	8,141		81,322	31,513
" tails	.. x 100 "	..	80,595	74,166		125,171	116,661		155,588	156,685
Conch	.. x 100 "	..	24,578	3,662		16,500	1,927		28,020	4,811
Shrimps	.. x 100 "	..	—	—		—	—		100	72
Tortoise shell	.. x 100 "	..	1,367	2,956		1,572	3,716		523	1,050

TABLE 2
METEOROLOGICAL DATA

BAROMETRIC PRESSURE				TEMPERATURE				RELATIVE HUMIDITY				EVAPORATION				
Month	MEAN MONTHLY			MEAN MONTHLY MAXIMUM			MEAN MONTHLY MINIMUM			MEAN MONTHLY			MEAN MONTHLY			
	Belize	Stann Creek	Belize	Stann Creek	Toledo	Central Farm	Belize	Stann Creek	Toledo	Central Farm	Belize	Stann Creek	Toledo	Central Farm		
January ..	30.08	30.05	84	82	82	81	73	63	68	64	90%	80%	87%	71%	N.A.	N.A.
February ..	29.97	29.98	85	84	84	84	73	63	65	66	86	76	82	90	2.56	N.A.
March ..	29.92	29.91	85	87	87	85	74	64	67	65	81	71	72	81	2.98	2.61
April ..	29.92	29.90	87	87	88	91	77	68	71	67	81	73	74	71	3.24	4.69
May ..	29.88	29.85	90	90	90	96	78	73	72	70	80	78	76	75	3.09	4.82
June ..	29.87	29.82	91	90	90	93	79	72	73	70	78	77	83	73	2.88	3.42
July ..	29.96	29.89	81	88	88	89	77	68	73	71	81	77	87	87	2.36	2.74
August ..	29.95	29.89	91	89	90	91	78	72	72	63	83	74	84	71	2.07	2.53
September ..	29.90	29.85	90	88	87	87	77	71	70	67	88	81	84	86	1.76	2.47
October ..	29.96	29.98	87	87	87	90	73	68	67	64	86	74	80	95	2.08	2.45
November ..	29.96	29.94	88	86	81	87	75	67	58	65	89	82	84	95	2.08	2.62
December ..	30.06	30.03	86	80	75	80	68	67	55	60	89	87	87	90	2.13	2.03

<i>Section and Post</i>	<i>Name</i>	<i>Place Stationed</i>	<i>Emoluments met from</i>	<i>Remarks</i>
Headquarters, Central Farm.				
Director of Agriculture	M. A. G. Hanschell	Central Farm	Local Budget	Appointed 24.9.57 on transfer from St. Lucia
Senior Agricultural Officer ..	A. N. C. Thomas	" "	" "	Acting Director of Agriculture to 23.9.57
Assistant Secretary ..	E. P. Bradley	" "	C.D. & W.	
1st Class Clerk ..	R. E. Ramirez	" "	Local Budget	
Accountant ..	L. A. Robateau ..	" "	C.D. & W.	1st Class Clerk seconded
Assistant Accountant ..	K. E. Richardson	" "	C.D. & W.	2nd Class Clerk seconded
2nd Class Clerk ..	J. C. Stephen	" "	Local Budget	
Temporary Clerk ..	A. F. Mahler	" "	Local Budget	
Typist, Temporary ..	Miss R. A. Cattouse	" "	Local Budget	
Typist, Temporary ..	Miss M. del C. Juan	" "	C.D. & W.	
Farm Manager, Central Farm.				
Farm Manager ..	I. S. Hazell	" "	C.D. & W.	
Foreman Mechanic ..	R. E. Jex	" "	Local Budget	
Senior Mechanic ..	W. A. Saunders	" "	Local Budget	
Storekeeper Recorder ..	S. B. Daniels	" "	C.D. & W.	Seconded to Agri. Credits Fund as F/Officer
Farm Accounts Clerk ..	H. E. Lightburn	" "	Local Budget	
Agricultural Chemist.				
Agricultural Chemist ..	D. H. Romney	" "	C.D. & W.	
Temporary Farm Demonstrator ..	W. T. Ebanks	" "	C.D. & W.	
Temporary Farm Demonstrator ..	E. H. Robinson	" "	C.D. & W.	
Laboratory Storekeeper ..	H. W. Ford	" "	C.D. & W.	Serving as Laboratory Assistant
Assistant Analyst ..	R. R. Locke	" "	"	
Experimental Officer.				
Experimental Officer ..	vacant	" "	"	
Temporary Farm Demonstrator ..	L. B. Flores	" "	"	
Temporary Farm Demonstrator ..	H. A. Reyes	" "	"	
Animal Health Officer.				
Animal Health Officer ..	vacant	" "	"	
Livestock Officer ..	S. S. Dale	" "	"	Transferred to Jamaica on 31.1.57

APPENDIX III (Continued)

Section and Post	Name	Place Stationed	Emoluments met from	Remarks
Livestock Assistant	 W. J. Baeza	Central Farm	C.D. & W.	Farm Demonstrator seconded
Agricultural Education Officer.				
Agricultural Education Officer	 C. A. S. Hynam	" "	"	On sick leave from 23.7.57 close of year.
Clerk-Handyman Assistant	 L. A. Marin	" "	"	
Land Clearing Engineer.				
Land Clearing Engineer	 J. B. Hutchinson	" "	C.D. & W.	On leave from 4.10.57 to July 1958
Land Clearing Engineer (Acting)	 E. D. S. Kemp	" "	C.D. & W.	During absence of Mr. Hutchinson
Rice Scheme.				
Rice Officer	 S. R. Morrison	Boom Rice Station	C.D. & W.	
Farm Demonstrator, Grade I	 C. D. W. Atkins	" "	Local Budget	
Mechanic	 N. J. Patnett	" "	C.D. & W.	
Northern Districts.				
Agricultural Officer	 E. G. Russell	Orange Walk	Local Budget	
Farm Demonstrator, Grade I	 H. S. Nelson	" "	Local Budget	
Senior Farm Demonstrator	 P. B. Lizarraga	Corozal	Local Budget	
Temporary Farm Demonstrator	 E. F. Bautista	Hillview	C.D. & W.	
Temporary Farm Demonstrator	 J. D. Gonzalez	Orange Walk	C.D. & W.	
Farm Demonstrator Grade I	 A. J. Lizama	Louisville	Local Budget	
Temporary Farm Demonstrator	 C. Torres	Yo Creek	C.D. & W.	
Foreman	 H. C. Bennett	Orange Walk	C.D. & W.	
Storekeeper Recorder	 Miss P. Espejo	" "	C.D. & W.	
Veterinary Officer.				
Veterinary Officer	 vacant			
Farm Demonstrator, Grade I	 W. A. Grant	Belize	Local Budget	Seconded to Agric. Credits Fund as Field Officer
Temporary Farm Demonstrator	 L. V. Gabourel	"	C.D. & W.	
Belize District.				
Senior Farm Demonstrator	 F. F. Orio, Snr.	Boom	Local Budget	
Farm Demonstrator, Grade II	 T. T. Ramos	Belize	Local Budget	Seconded to Coconut Industry Board
Temporary Farm Demonstrator	 E. O. R. Gill	Freetown, Sibun River	C.D. & W.	
Temporary Farm Demonstrator	 J. A. Santos	Lucky Strike	C.D. & W.	

APPENDIX III (Continued)

Section and Post	Name	Place Stationed	Emoluments met from	Remarks
Stann Creek District.				
Assistant Agricultural Officer	.. F. F. Orio, Jr.	Agstat, Stann Creek Valley	Local Budget	
Farm Demonstrator, Grade I	.. J. A. Swasey	Stann Creek	Local Budget	
Farm Demonstrator, Grade I	.. T. L. Brackett	" "	Local Budget	
Temporary Farm Demonstrator	.. N. L. Williams	" "	C.D. & W.	
Temporary Farm Demonstrator	.. A. F. Thompson	" "	C.D. & W.	
Farm Demonstrator Trainee	.. G. C. Ellis	" "	Local Budget	
Storekeeper Recorder	.. F. J. Bradley	Agstat, Stann Creek Valley	C.D. & W.	
Foreman	.. N. E. McKenzie	Agstat, Stann Creek Valley	C.D. & W.	
Toledo District.				
Agricultural Officer	.. M. K. Chopin	Agstat, San Antonio Rd.	Local Budget	
Temporary Farm Demonstrator	.. A. Gentle	Dump, San Antonio Rd.	C.D. & W.	
Temporary Farm Demonstrator	.. G. C. Castillo	Dump, San Antonio Rd.	C.D. & W.	
Temporary Farm Demonstrator	.. A. P. Bautista	Punta Gorda	C.D. & W.	
Temporary Farm Demonstrator	.. F. B. Arana	Barranco	C.D. & W.	
Storekeeper Recorder	.. C. A. Williams	Agstat, San Antonio Rd.	C.D. & W.	
Foreman	.. J. Jacobs	Agstat, San Antonio Rd.	C.D. & W.	
Cayo District.				
Agricultural Officer	.. R. S. Pitt	Cayo	Local Budget	
Farm Demonstrator, Grade II	.. F. Bautista	Succotz	Local Budget	
Temporary Farm Demonstrator	.. G. I. Marin	Cayo	C.D. & W.	
Temporary Farm Demonstrator	.. M. Avila	Mt. Hope	C.D. & W.	
Hurricane Rehabilitation Scheme.				
Secretary Coconut Industry Board	.. H. P. Charnock-Wilson	Belize	Hurricane Rehabilitation Scheme	
Clerk, Coconut Ind. Board	.. S. C. Arzu	Belize	"	
Temporary Accountant	.. E. O. B. Barrow	Belize	"	
Temporary Cooperative Officer	.. M. Ayuso	Orange Walk	"	
Temporary Cooperative Officer	.. H. Bennett	"	"	
Temporary Farm Demonstrator	.. J. Carillo	San Pablo	"	
Temporary Farm Demonstrator	.. A. Correa	Hillview	"	
Temporary Farm Demonstrator	.. S. Escalante	Sarteneja	"	
Temporary Farm Demonstrator	.. G. Hernandez	San Estevan	"	
Temporary Farm Demonstrator	.. G. Tzib	Patchacan	"	

APPENDIX IV

LOCAL WEIGHTS AND MEASURES

1 quartia	=	$\frac{1}{2}$ almud = $2\frac{1}{2}$ quarts
1 almud	=	5 quarts
1 benequen	=	15 quarts
1 shushack	=	4 almuds = 20 quarts
1 cargo	=	60 quarts = 12 almuds

1 barrel = 110 quarts

300 ears of corn in husk = 60 hands

1 hand = 5 ears i.e. the number picked up in each hand when counting ears

60 hands = 300 ears = (should shell out to) 1 cargo

1 mecate = 1 task = 25 yards x 25 yards approximately one-eight acre

16 mecates = 1 manzana = approximately 2 acres

($8\frac{1}{2}$ varas plus 1 machete length = mecate)

1 cart load firewood = 300 sticks at 3 ft. long

1 fathom = 6 feet = 1 brassada

(Brassada is literally the distance between out-stretched arms (brassos))

CITRUS

A unit of grapefruit is a 70 lb. box

A unit of oranges is a 90 lb. box

A/2 juice carton contains 24 x 12 oz. tins

A/10 juice carton contains 12 x 24 oz. tins

Barrels contain 43 gallons

4 British Honduras Dollars equal £1 Sterling

1 British Honduras Dollar equals Five Shillings Sterling

